The Journal

OF THE

Department of Agriculture.

1934-35.

VOL. XXXVIII.

THE JOURNAL

OF THE

Department of Agriculture

OF

SOUTH AUSTRALIA.

ISSUED UNDER THE AUTHORITY OF THE HON. MINISTER OF AGRICULTURE.

Vol. XXXVIII.—August, 1934, to July, 1935.

ADELAIDE:
FRANK TRIGG, GOVERNMENT PRINTER, NORTH TERRACE.
1935.

INDEX.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA, INDEX TO REPORTS OF MEETINGS.

AUTHORS.

INDEX TO PAPERS READ BY MEMBERS OF THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

GENERAL.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. AUGUST, 1934. No. 1.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Hills, at Coromandel Valley (Blackwood Branch), Thursday, August 23rd, H. Goldsack, Coromandel Valley (Secretary).

Eyre's Peninsula (Southern), at Yeelanna, Wednesday, September 5th, R. R. Wilson (Secretary).

Eyre's Peninsula (Central), at Kyancutta, Friday, September 7th, E. A. Kelly (Secretary).

Pinnaroo Line, at Pinnaroo (Parilla Well Branch), Tuesday, September 18th, E. C. Slater, Pinnaroo (Secretary).

Murray Lands (East), at Caliph, Thursday, September 20th, W. H. Todd (Secretary).

Fruit (Non-irrigated Districts), at Balhannah, Tuesday, November 6th, C. G. Grasby (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held as follows:—

Maitland, Wednesday, September 26th.
Denial Bay, Friday, September 28th.
Gawler, Saturday, September 22nd.
Balaklava and Dalkey, Saturday, September 29th.
Jamestown, Wednesday, October 10th.
Karoonda, Wednesday, October 3rd.
Loxton, Wednesday, October 10th.
Burra, Wednesday, October 24th.
Minlaton, Wednesday, October 24th.
Mount Gambier, Wednesday and Thursday, October 24th and 25th.
Murray Bridge, Thursday, October 25th.
Woodside, Saturday, November 3rd.

Registration of Stallions.

Under the Draught Stallions Acts, 1932-33, it is compulsory for owners to register all draught stallions of two years and over. The list of stallions registered to June 30th, 1934, is published in the *Government Gazette* of August 16th, and reference is made to those stallions which have so far been examined and have secured certificates. The Chief Inspector of Stock (Mr. C. A. Loxton) points out that some owners are of the opinion that it is not necessary to register stallions which are not used for hire. This opinion is wrong, as all draught stallions, whether used for hire or exclusively on owners' farms, must be registered in accordance with the Act.

Congress.

...proval has been given to hold the Annual Congress this year on the same conditions ...ve applied in the past. The opening session will be on Monday, October ...delegates and other members of the Agricultural Bureau are requested to ...e at 7.45 p.m. The congress will be continued on October 9th and ... evening sessions.

Financial Relief Act (Federal).

Information has been received from the Prime Minister that the Financial Relief Act of 1934 provides for the granting of assistance to primary producers, other than wheat growers, by making a payment to them out of Commonwealth funds at the rate of 15s. per ton for each ton of artificial manure used by them. The period during which the fertilizer is to be applied to the soil is July 1st, 1934, to June 30th, 1935. The terms and conditions are generally the same as those of the Act which was passed in 1932, and provided for a similar grant. Provision is also made for assistance to growers of apples and pears to an extent equal to that which was made available last year, the methods and terms of distribution being left entirely to the States. The allocation among the States has been based on the same principle as last year, viz., the exports during the financial year immediately preceding that in which the grant is to be made.

Wheat and Mill Products—Why Prices Vary in Different States.

At the Conference of Upper North Branches of the Agricultural Bureau, held at Wilmington on July 18th, a delegate from the Morchard Branch asked "What is the explanation of the higher price for wheat in Melbourne and Sydney over Adelaide prices, and the lower prices for flour, bran, and pollard in those cities?" The following reply was supplied by the Secretary of the Co-operative Wheat Pools Limited:—"Farmers and others who study interstate produce market reports are likely to be puzzled at the marked difference in prices of wheat and mill products in the several capital cities, and the apparent inconsistencies that exist in some instances. These differences may be accounted for in several ways, but as they are not apparent in the published reports, most readers will probably gain wrong impressions therefrom.

The press reports of wheat, flour, and offal prices at the end of June were as follows:—

	Wheat (Bushels) Shipper's Price for farmers' lots.		Flour (Ton).			Bran (Ton).			Pollard (Ton).		
	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Adelaide	2	6½	7	17	6	5	5	0	5	0	0
Melbourne	2	8½	7	12	6	4	5	0	4	15	0
Sydney	2	9	8	0	0	4	5	0	5	0	0
Perth	2	8	8	5	0	4	17	6	5	7	6

As regards wheat quotations it must be remembered that they are subject to deduction for receiving agents' commission, which amounts to 1½d. per bushel in South Australia, also freight charges from receiving point to shipping port, so that the farmer actually receives substantially less for his wheat when delivered at a country siding than the price quoted in the press. On the other hand quotations for millers' parcels are usually several pence a bushel higher than those for farmers' lots, the difference representing the merchants' handling costs and profit.

Apart from the consideration that the rate of commission paid agents varies as between the different States, there are several other factors which tend to place South Australian prices below those quoted in other parts of the Commonwealth. One of the chief depressing influences is the high shipping charges imposed on wheat in South Australia; first, there is wharfage, which absorbs nearly one halfpenny a bushel. This is a charge which is not levied on shipments from Victoria or Western Australia, and is much higher than the rate in New South Wales. Port dues and other items make the total charges in South Australia by far the highest in the Commonwealth, and as under the present system of trading prices are based on the inequitable "London parity" basis all these charges ultimately are borne by wheatgrower.

he matter of shipping freights, too, South Australia is at a disadvantage on f her geographical position. Western Australian shippers receive an freight both to Europe and the Orient, and this may amount to as

much as one penny per bushel. Victoria and New South Wales also enjoy some advantage in freight to eastern ports. The concentration of shipping to one or two ports is another advantage enjoyed by the eastern States, one tangible result being the greater amount of parcel freight for both wheat and flour available for shipment from Melbourne and Sydney, and parcel freight rates are usually substantially lower than full cargo rates. Parcel space from South Australian ports is decidedly limited, and is rarely available for any other port than Adelaide, which is especially disadvantageous as regards wheat shipment.

A distinct advantage has been won for Western Australian wheat in that its quality has for some years been uniformly superior to that grown in other parts of the Commonwealth. Overseas buyers have appreciated this fact, and a premium of from 1d. to 2d. per bushel is frequently obtainable for western wheat.

The fact that wheat may be purchased in bulk in New South Wales and Western Australia also has an influence on the price as buyers under that system are assured of a more uniform and cleaner sample.

The larger demand by millers in New South Wales and Victoria is probably the principal influence which keeps wheat prices there above those in South Australia. Both the eastern States have considerable trade in export flour, in addition to a much more extensive local trade than is available in this State. The extent of the export flour position may be realized from the figures relative to the 1923-33 season. In that year New South Wales exported 234,000 tons, Victoria 221,000 tons, and South Australia 56,000 tons. The local trade both in New South Wales and Victoria is at least three times as great as in South Australia.

As regards flour it will be observed that while the Adelaide price is above Melbourne it is below the Sydney and Perth figures. It has been explained that there are certain differences in the basis of quotation in the various States. For example, South Australian prices cover delivery to buyers' premises, including many country towns, while in Victoria there is a scale of charges for delivery. These differences may account, in part at least, for the disparity in prices, but the greater turnover previously referred to is, no doubt, a very important factor in the milling industry, and it has enabled the milling concerns in the eastern States to install the most modern and economical equipment and reduce the ratio of overhead charges to a minimum.

The position with regard to mill offal is similar to that which applies to flour. There is a difference in the basis of quotation—Adelaide prices being subject to certain discounts for delivery ex mills and for truck load quantities, while eastern States prices are nett for truck loads. There is a wider demand for offals for stock feed purposes in the eastern States, and the greater turnover again would allow lower production costs and distributing charges.

Crop Competitions.

The Government has approved of a grant of £100 for distribution among the various District Crop Competition Committees for this year. Intending competitors are reminded that they should communicate with their District Secretary intimating their intention to compete.

District Secretaries are as follows:—

District. Secretary. Address.

Albert—G. H. Sutherland, Copeville.
Alfred—G. L. Chinner, Box 68, Loxton.
Balaklava—J. D. Harkness, Owen.
Buxton—F. R. Illman, Box 64, Kimba.
Central—E. Day, Wasleys.
Chandos—H. G. Johnston, Parilla.
Far Northern—E. J. Martin, Orroroo.
Flinders—R. R. Wilson, Yeelanna.
Hopetoun—H. V. Hobbs, Coorabie.
Jervois—F. Coles, Mangalo.
Le Hunte—F. L. Johnson, Wudinna.
Midland—F. W. Coleman, Saddleworth.
Mid-Northern—W. Pengilly, Yacka.
Mid-Yorke Peninsula—E. H. R. Dutschke, Box 2, South Kilkerran.
Northern—J. E. Lehman, Caltowie.
Northern Yorke Peninsula—S. G. Chynoweth, Boors Plains, Kadina.
Robinson and Dufferin—H. Doley, Box 8, Wirrulla.
Russell and Buccleuch—G. R. Tregilgas, Yurgo.
Southern—J. M. Hudd, Bletchley.
Southern Yorke's Peninsula—H. W. Cornish, Stansbury.
Tatiara—W. Flower, Bordertown.
Upper North—W. J. Ninnes, Tarcowie.
Way—G. W. Denton, Charra.
Western—A. M. Lawrie, Nelshaby.

Herd Testing Fees.

For the financial year 1934-35, the herd entrance fee for official herd testing will be reduced from £6 10s. to £3 5s., and the 10 per cent. levy on the selling price of bulls will be waived. The waiving of the levy will be made possible by an anticipated saving in having the official testers present at two consecutive milkings instead of three.

In consequence of the reduction in the herd entrance fee by £3 5s., the minimum cost per herd for official testing will this year be £5 5s. instead of £8 10s. This sum will cover the testing of four cows.

Where the fees for 1934-35 have been paid in excess of what is now required under the new scale of charges refunds will be made. If, on the other hand, fees are still outstanding, payments should be made early.

Under the new arrangement whereby official testers will not stay so long at each dairy, it will be possible for them to visit a larger number of breeders, and consequently it is expected that there will be vacancies for several more herds.

Deputy Chief Horticultural Instructor.

Mr. A. G. Strickland, who was recently appointed Deputy Chief Horticultural Instructor, holds the degrees of Bachelor of Agricultural Science and Master of Agricultural Science in the University of Melbourne. He joined the Horticultural Division of the Victorian Department of Agriculture, where he held the position of Horticultural Research Officer at the time of his appointment to the South Australian Department. In the Victorian Department his duties were largely of an investigational nature and included general routine and extension work in various branches of horticulture. He thus became associated with experimental and observational work on a wide range of horticultural crops and problems, as indicated in the following summary:—Research on deciduous fruits in regard to manuring, stocks, pollination, removal of spray residues, and fundamental statistical work in the planning and technique of field trials with horticultural crops; the determination of a proper basis for field experiments with grape vines and the initiation of carefully planned fertilizer experiments on wine grapes at the Rutherglen Viticultural Station; the conduct of experiments in regard to the cultural and disease problems of tomatoes, and the charge of the departmental experimental field at Bendigo; association with field and laboratory work in connection with the soil alkali and drainage investigations conducted by the Irrigation Research Committee at Tresco; extensive experience in irrigation practice and soil and drainage problems at Tresco; inquiring, as a member of a committee, into the loss of large numbers of canning-fruit trees in the Goulburn Valley Irrigation Area in 1931; experiments in regard to fruit storage, and investigations carried out by the Citrus Preservation Committee; responsibility for directing and examining the results of fundamental experiments dealing with the effects of orchard variation on sampling methods in storage experiments.

Mr. Strickland travelled extensively throughout the fruit-growing districts of Victoria, and gained a wide experience in the preparation and delivery of lectures at meetings of orchardists. He has written articles on "Spray Residues on Fruit—Methods of Removal," "Harvesting Apples," "Winter Injury to Peach Trees," "A Wine Uniformity Trial," "Tomato Culture—Raising Healthy Seedlings," "The Pollination of Fruit Trees," "Removal of Arsenical Spray Residues from Apples," "Tomato Investigations at Bendigo, 1929-30," "Strawberry Culture," and "Orchard Manuring."

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. Spafford, Deputy Director of Agriculture.]

Manurial Value of Bone Manure and Sheep Droppings.

Waikerie asks—What are the analyses of No. 1 Bone Manure and Sheep Droppings, and what are their comparative values as fertilizer?

Reply (supplied by Mr. W. J. Spafford, Deputy Director of Agriculture)—It is impossible to make a proper comparison between No. 1 Bone Manure and Sheep Droppings, because the former supplies nitrogen and phosphoric acid, but no organic matter, whereas the latter is essentially an organic manure containing a little plant food. The analyses of the fertilizers are as follows:—

Fertilizer.	Nitrogen. (N)	Potash. (K_2O)	Phosphoric Acid. (P_2O_5)
	%	%	%
No. 1 Bone Manure	7·50	–	11·45
Sheep Droppings—			
Dry (15% water)	1·99	1·61	0·55
Fresh (64·6% water)	0·83	0·67	0·23

No. 1 Bone Manure is £9 10s. per ton, and if the phosphoric acid in it costs 3s. 10d. per unit (per cent. per ton), which it does when acid-soluble phosphate is 1s. 9d. per unit, as at present, then the nitrogen will be worth 19s. 6d. per unit. Using these figures of 3s. 10d. per unit for phosphoric acid, 19s. 6d. per unit for nitrogen, and 7s. per unit for nitrogen and 7s. per unit for potash (as in muriate of potash), the manurial constituents of Dry Sheep droppings are worth £2 12s. 2d. per ton, and in Fresh Sheep Droppings, £1 1s. 9d. per ton.

It must not be lost sight of, however, that the chief value of animal droppings does not depend upon the manurial constituents contained in them, but their greatest worth is as a soil improver. The Soil Amendment value of organic manure is very difficult to state in terms of pounds, shillings and pence, but it is very high for the fruit-growing districts of the Murray River.

(Southern Conference, Strathalbyn, August 16th, 1934.)

Meadow Hay.

Port Elliot: "What is the best method of making meadow hay?"

Reply: The method employed in the making of meadow hay in the Adelaide Hills varies according to the weather experienced at the time of cutting the forage and according to whether clover or grass predominates in the pasture.

If there is more Subterranean clover than grass present, the material should be cut as soon as the clover shows signs of maturing, which is evidenced by some of the base leaves beginning to become yellow, and the presence of plenty of seed burrs at the surface of the ground. If, however, grass predominates, whether it be Rye grass, Soft Brome, Great Brome, or Silver grass, the hay should be cut soon after the grass has headed.

When the weather is fine at haymaking time, the mowers should not be started until after the dew has dried from the crop, because external moisture is harmful to meadow hay, and if fairly plentiful may ruin the forage. This is so important that it is usual with many successful makers of meadow hay to delay cutting for some days if the weather is dull and damp.

Should it be necessary to cut the forage when wet, it is left in the swath until the surface dries before being raked into windrows; but when the weather is favourable for haymaking the material can be put into windrows as soon as cut, and after being left there for about half a day is built into cocks. If the weather is dry during haymaking, the cut forage is put into cocks as soon as possible after cutting. To hasten curing and to facilitate handling, the cocks should be of such size that they can be lifted at a single forkfull.

Meadow hay should not be left out in the field longer than is necessary to cure it, but should be stacked or baled as soon as ready, and a common test to help decide when to stack is to take a handful of the hay from the centre of a cock and twist it very tightly, and although it may feel moist to the hands, if no sap is squeezed from the stalks it is quiet safe to cart to shed, stack, or press. If stacked when too moist there is a danger of decomposition and the development of moulds, and in extreme cases the heat developed may lead to spontaneous combustion, and when there is the least fear that the hay being stacked is too moist a liberal supply of salt should be added to each layer of hay to keep down the decomposition.

Meadow hay is so valuable that it should be stored in sheds instead of in exposed stacks, wherever it is possible to do so, and if large quantities are to be cured and stored it is probably better to press it into bales in the field and store the bales of hay in a shed.

Low Quality Wheats in South Australia.

Hartley: *Are there too many low quality wheats grown in South Australia?*

Reply: Because of the fact that in days gone by wheat merchants have made weight per bushel the only standard of quality, farmers have sought heavy-yielding varieties of wheat which also weighed well, and breadmaking qualities have been sadly neglected.


FULL WIDTH!
DUNLOP
"Only in Dunlop do you get the EXTRA Safety of a road-grip right across the tread!"
DUNLOP
Gold Seal
The greatest tyre in British History.

The result has been that our flour has deteriorated and exported wheat is not purchased as readily as was the case at one time. Fortunately the position is not so very bad in South Australia that it cannot be rectified fairly quickly, and now that all wheat-breeders, most local millers, and many up-to-date wheatgrowers are alive to the need of improving the breadmaking qualities of the wheats grown in the country an improvement can be expected in the near future.

Most of the varieties of wheat commonly grown in the State possess fair quality, but there are a few fairly prominent ones much below standard, and probably the worst one in this direction is Gallipoli, because it is such a heavy-yielding variety in all sorts of conditions, but unfortunately the flour produced from it is of very low quality.

If a variety can be found that will behave as well in the field as does Gallipoli, and at the same time produce grain of good quality, we would again be able to sell our wheat fairly readily; but more than this must be done, for if we are to hold the overseas wheat markets against other countries with similar climate we must develop new wheats which will give heavy yields of grain of a quality above that of most of the well-known varieties now grown. Roseworthy Agricultural College has already started work in this direction, and with the aid of the Pelshenke test for quality, is hopeful of producing new varieties capable of increasing the yield of the State and at the same time improving the quality of the flour produced from our wheat.

Most Suitable Breed of Ram to Produce Fat Lambs.

Port Elliot: What is the best breed of ram for fat lambs?

Reply: For the production of fat lambs in South Australia the Southdown is the most useful breed to use as the sire of the lambs. This is largely due to the facts that:—

1. The great bulk of our fat lambs are exported to Great Britain, where the highest-priced lambs are of short carcass, broad of back, deep in the hind quarters, carrying the minimum of bone, and sired by a black-faced ram, and the Southdown ram is the one which produces this type with more certainty than does any other breed.

2. The Southdown retains its high rate of fertility in our warm climate a good deal better than most other of the mutton-producing breeds of sheep, with the result that more lambs are secured from a given number of ewes when mated to Southdown rams.

3. Most of the ewes used as dams of fat lambs in this country are of the Merino breed, and because of the small size of the Southdown very little trouble is experienced at lambing time and loss of ewes is exceptional when Southdowns are mated to ewes of any breed.

4. Although lambs sired by Southdown rams do not develop so rapidly as lambs by some other breeds of rams, they possess wonderful fattening qualities, and practically all lambs bred by Southdown rams eventually become marketable, no matter how severe the conditions were whilst being reared. This power of recovering from a setback received when young is of great value in those districts where feed might be short at lambing time.

5. Lambs by Southdown rams lose less on slaughter than lambs by any other breed of ram.

6. When fat lambs are reared under ordinary farming conditions in South Australia, those by Southdown rams will produce a higher percentage of first-grade lambs than will any other cross.

Under some special circumstances other breeds of rams may prove more suitable than the Southdown for producing fat lambs, but for South Australian conditions generally no other breed has been proved to equal the Southdown.

ERGOT POISONING.

Reporting that sickness in horses in the Petina district had been diagnosed as "ergotism," the Secretary of the local Branch of the Agricultural Bureau has been advised by Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., Deputy Chief Inspector of Stock, that ergotism or ergot poisoning is due to the eating of rye, various kinds of hay, or grasses infested with the ergot fungus (*Claviceps purpurea*). It is a rare disease in this State, the characteristic feature of ergot poisoning being an irritation and pain of the extremities of the body, such as the feet and tail. Later, areas of the skin become gangrenous and may slough off. There are two forms recognised:—(*a*) Animals become dull and listless, cold sweats break out on the neck and flanks, breathing slow and deep, temperature below normal, pulse weak, and death occurs during deep coma (unconsciousness). In other cases, where the amount of contaminated fodder taken has been small and over a longer period of time, there may be diarrhoea, colic, and symptoms of severe abdominal pain. (*b*) The gangrenous form. *Treatment.*—Where it is definitely known to be due to eating food containing the fungus, the first step to take is to cease feeding such food. Affected animals should be given individual attention. They should be given stimulants, such as strong black coffee, whisky, brandy, &c., either with or immediately after the administration of raw linseed oil (1-1½ pints). Where gangrene has set in, treatment is useless and animals should be destroyed.

ACTIVITIES AT ROSEWORTHY AGRICULTURAL COLLEGE, 1933-34.

PART III.—CEREAL BREEDING, PURE SEED PRODUCTION AND VARIETY TRIALS.

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc., (Oxon); B.Sc.Agr. (Syd.), (Principal), E. J. BREAKWELL, B.Sc.Agr. (Syd.), Plant Breeder), and S. R. KLOSE, R.D.A. (Field Officer).]

A full account of the objectives of cereal breeding, the manner by which they might be obtained, as well as a detailed programme for pure seed production at Roseworthy College formed the theme of an article published in the *Journal of Agriculture* for July, 1933. A thorough and careful revision of procedure was considered necessary in order to overcome obvious difficulties and replace obsolete methods with those of more recent development. With the changes it is expected that much time will be saved without fear of prejudicing the results, and indeed greater accuracy and precision is the guarantee given by using analytical methods based on sound scientific principles. This applies particularly to the plant breeding methods, the conduct of trials to test the comparative worth of new crossbreds and introductions, and well-known varieties. The scheme for the production of pure seed was based upon equally sound principles, but the chief consideration after intitial selection is the employment of plenty of sound common sense so that subsequent seed multiplication is free from as many possibilities of error and admixture as possible. While at the time the scheme was largely hypothetical in nature, from the results and encouraging experiences obtained last season full confidence in the applicability and efficacy of the changes has been established.

In the preceding report on the general farm work at the College a full account of the conditions prevailing throughout the season was given. The specialised work under review benefited greatly from the bounteous season enjoyed, high yields were obtained and considerable progress was made in all phases of the work. Many of the general observations made in reporting on the crops grown on the main areas of the farm apply to the cereals grown in the experimental field, with the exception that in the spaced rows the finishing conditions did not operate with the same severity as they did under field conditions. The variety trials, however, suffered, but the results obtained may be depended upon to be typical of ordinary field response under similar environment. Other features of the year were the phenomenal growth of straw, and almost complete absence of serious diseases.

The work reported hereon was practically all conducted in one field of about 40 acres marked on the College map as No. 4A, and included all operations connected with cereal breeding, the testing of crossbreds and new varieties, the yield testing of established varieties and the very important preliminary stages of pure seed production. The success of such work is very largely dependent upon proper co-ordination, and all phases are essentially inter-related, but for the purposes of this report, clarity demands that the three main issues be dealt with individually, consequently an outline of the year's work in cereal breeding precedes the progress report on pure seed production and the results obtained in the variety trials.

CEREAL BREEDING.

With the wheat industry in a devitalised state, active and generous interest on the part of farmers in wheat breeding problems has declined, yet at the moment the value of any variety which may claim to increase the cash returns of the grower would probably be a greater boon to the farmer than any artificial

stimulus that might be administered as a temporary expedient. Any increase in cash returns per acre strikes at the very root of the trouble, operating as it does as a credit offsetting the burden of acreage costs.

From the national point of view, therefore, wheat breeding retains its prideful position of importance; for it to wane in keeping with the decline in vigour of the industry would be fatal and disastrous in the long run. Progress is slow, but once a full and comprehensive programme is in active operation results come with regularity, varieties are evolved to overcome certain diseases, to suit certain soils, certain seasonal conditions and to fill certain specific requirements. The first and foremost necessity is therefore to plan the work well ahead, with breadth of vision, and obtain material from which the various types might be selected. In order to build up a more comprehensive population of types and strains from which to select, a large number of crosses were made during 1933. These numbered fifty and have already been listed in the *Journal* for March 1934. The objective of all crosses is to gain a variety or varieties which will increase the monetary returns of those concerned in the industry. Actual prolificacy, or, the power to yield well, in itself does not fulfil this requirement for inherent high yielding ability is very often accompanied by defects such as poor milling and baking quality, susceptibility to disease, weak straw, or tendencies to shatter, any one of which may be quite sufficient to condemn a variety for general cultivation. In summating, therefore, the cross-breeding programme has as its object the combination of high yield with the attributes of disease and drought resistance, at least average quality, strong straw and non-shattering characters, thereby attempting to meet the demands for higher net returns.

With accurate technique, it is now possible to obtain a high percentage grain setting from flowers cross-fertilised, and, last year, with the avowed object of saving a generation, if possible, more flowers than usual were operated upon in the case of each cross; consequently a larger number of crossed grains was obtained. Under these circumstances it was possible to utilise some of the grains obtained from each cross in an endeavour to grow them through the summer months; in the event of failure ample grain was retained for growth at the normal time. The seed used for the interim crop was sown in a bird-proof enclosure, growth was maintained by irrigation whenever necessary, and the plants were afforded adequate shelter from the heat of the summer by hessian shields. Last summer was particularly severe, especially during the closing months, but the first generation (F1) seed sown

in December made remarkable growth, and yielded a surprisingly large amount of second generation (F2) seed. By this method two generations were obtained in one year, and valuable time thereby saved. It is not possible, of course, to grow other than F1 seed under such conditions, but the saving of one year in the production of new forms is quite a consideration. As a result of this approximately 70 crosses in the second generation were sown this year; thus within a few years there should be a large number of valuable lines in advanced generations. It is not feasible to expect the evolution of a good commercial variety from every cross; indeed, all crosses are not made with this immediate objective. Certain varieties may be crossed in an effort to obtain material possessing a combination of such characters as will be of value in breeding work in the future, although of no direct economic importance. This is merely a process of building up with the ultimate idea of grouping as many desirable characters in the one variety as possible.

The importance of careful selection from hybrid material is not generally realised, but it is the very basis of successful plant breeding work. Too often the layman is inclined to look upon the simple manipulations involved in making the cross as the very essence of the plant breeder's skill when, in point of fact, it is merely the foundation for the more important selective work to follow. The success or failure of any cross-breeding project is definitely dependent upon the selections which are made from subsequent generations; the ultimate value of lines produced is controlled by such selection. At the present time there are approximately 30 crossbred populations in a more advanced stage than the second generation. These were all subjected to rigorous selection during the season, a procedure which considerably reduced the number of inferior lines therein. The basis of this selection is simply the isolation of the best plants in every population. It is imperative, therefore, that every plant should be given an equal chance to express its characters; hence the necessity for careful space planting and uniform width between rows. The best plant does not necessarily mean the most spectacular, nor even the most vigorous. One particular plant may be especially robust. It does not follow, however, that its possibilities for yield are in keeping with its outward expression. Other characters require consideration—firstly, simple morphological characters, such as straw strength, height and fineness of straw, grain holding ability, and other characters of agronomic importance. By careful scrutiny and the spontaneous recognition of what is actually required, selection along these lines becomes a matter of systematic observation. From the viewpoint of physiological characters, such as disease and drought resistance, the problem is more involved. Seed of nearly all crossbred lines is artificially inoculated with spores of flag-smut and bunt each year, and single plant selections are, as far as possible, made only from lines resistant to these diseases. In this regard a rust epidemic to the plant breeder becomes a blessing in disguise, and through the medium of such some very useful selections can be made which would otherwise be impossible. In such cases the disease itself becomes the agent of selection. In fact, the wheat breeder is at a decided disadvantage in selecting for rust resistance unless rust occurs frequently. To overcome this, artificial means of inducing rust have to be resorted to in an attempt to save time and prevent the continuance of lines which may ultimately succumb to the ravages of the disease. Facilities are being provided at the College this year whereby at least mild epidemics of rust may be induced every season under more or less controlled conditions. This merely entails the provision of suitable conditions of humidity at certain periods of the year.

Selection for drought resistance falls into a similar category, and years such as the present afford the breeder excellent opportunities for vigorous culling of lines which are unable to compete with others grown side by side under the same adverse conditions. In this respect a drought year may be the means of eliminating much unsuitable material.

Having given due consideration to the simple morphological and physiological characters, attention is next directed to baking quality. Unfortunately this cannot be assessed in the field. All promising lines, however, are tested in the laboratory, and the figures for baking quality thus obtained are recorded, and form an important basis of elimination. A detailed description of the methods employed in selecting for baking quality appears in the *Journal* for July, 1934.

In spite of the fact that initial selection is based very largely upon apparent yielding capabilities, the actual assessment of yield can only be made in later generations. It is in the comparative yield tests conducted at this stage that a large percentage of crossbreds falls by the wayside. Even the most skilled observer cannot be sure of selecting only high yielding lines when the first selections are made.

Yield testing is carried out from the fourth to the seventh generations on a small scale in the hand plots. All promising lines are then promoted to field trials, where they are tested for at least three years in comparison with standard varieties. Unless a new variety is able to outyield the standard variety of its maturity class over a number of years it is not likely to establish itself favourably and permanently in competition with varieties already grown. For this reason it should not receive further encouragement. Refusing it a name and dropping it forthwith is a wise precaution against its possible release and subsequent swelling of the ranks of the already far too numerous mediocre varieties.

Of the crossbreds in advanced generations at the College (Ford x Merredin)[5] and (Ford x Carrabin)[5] are promising; high quality lines, possessing good agronomic characters, being present in both crosses. These are now being tested for yield. Unfortunately it is only in very recent years that the need in Australia for better quality wheats has been fully realised; hence most of the crosses made in the past have given rise to material deficient in this character. Although some of the crossbreds on hand may have produced some quite good varieties from the point of view of yield, the present policy demands that any new productions which do not possess baking quality at least superior to such types as Nabawa and Gallipoli should not be distributed. On this account many otherwise promising lines were rejected during the season.

Crosses which produced lines of at least fair quality are (Onas x Nabawa)[4], (Nabawa x Canberra)[4], (Ford x Gloss)[4], and (Gloss x Florence)[5]. All such lines have been retained, and will be carefully observed for agronomic characters and tested for yield and disease resistance.

Several improvements are to be inaugurated into the plant-breeding work this year. These include the growing of drill strips of the advanced lines of crossbreds, interspersed with strips of standard varieties in order that the field behaviour of these lines may be studied and compared with that of the established varieties. A more extensive system of yield-testing varieties and crossbreds in the hand rows has been adopted, and these yield-tests will serve as a forerunner to the field trials, and no variety will be promoted to the latter without the fullest qualifications. An active policy of introduction of new varieties from other States and countries has been maintained. Such introductions are subjected to close observation, and their direct commercial value or their indirect value in breeding work estimated.

While it is unreasonable to expect the evolution of the perfect variety, small improvements from year to year should be possible once the present programme is in full swing. It is by such improvements that the margin of profit in wheat growing is increased, and the Australian farmer placed in a better position to meet overseas competition.

Trials with grazing oats are also being conducted, and a progressive programme of barley and oat breeding commenced.

PURE SEED PRODUCTION.

The production of pure seed is a very important function of the College. Seed of all common varieties is distributed to the farmer as true to type and as free from admixture as possible. The foundations for this are dependent upon careful selection of high-grade plants, and the propagation and increase of the resultant seed from year to year. All chances of contamination are minimised, and all varieties are subjected to the strictest scrutiny, so that the seed offered for sale each year may be of the highest standard possible. The pure seed programme being conducted was introduced in 1932, and was fully explained in the *Journal* (July, 1933). The general working of the scheme has been fully tested and found to be both practical and efficacious.

One important aspect of pure seed production might be mentioned at this juncture. Actually the College attempts to supply the requirements of farmers to the fullest extent, but it must be realised that many miscellaneous varieties which are considered inferior to other better known and more useful ones have to give precedence to the latter, otherwise our College areas would be devoted largely to varieties definitely unsuitable to the environment in which the work is carried out. As it is, more varieties are grown on the Farm than is considered necessary so that these demands may be filled. By doing this, the average College yields are appreciably affected, but the general policy in mind is to concentrate on varieties considered to be the most useful to foster throughout our wheat lands.

During last season careful single plant selections were made from all common commercial varieties, but special attention was given to the following because of their popularity and general usefulness and because their present variability offers a genuine field for substantial improvement:—

Sword.—There appear to be three strains in the commercial Sword—a plump grained, a shrivelled grained, and a purple strawed type. Unfortunately the season was such that the purple straw was not obvious, and hence this type could not be rogued from the pure seed rows with any certainty. A very noteworthy observation made during the year, however, was that plants possessing purple straw have a decided tendency to snap off at the head; the consequences of this are obvious. Bearing this in mind, a block about 50 yards of one of the pure seed rows was carefully rogued of all plants showing this weakness, and the resultant seed should give rise to a line containing very few purple strawed plants. Roguing the pinched grain type was also difficult, as this only appears in adverse seasons. Both these strains undoubtedly have a deleterious effect upon yield, and their elimination, which is in progress, will greatly enhance the value of this variety.

In the meantime the present sample of Sword sown in the stud plots is sufficiently good to warrant its continuance as pure seed; indeed, it is probably a distinct improvement over any commercial Sword in the State.

Ford.—Many crops of Ford show considerable diversity in type, but lines were isolated at the College last year which comply in all details to the true Ford, and contain none of the inferior strains. Small amounts of high-grade Ford should be available in the coming harvest, and there should be an abundant supply of seed by the harvest of 1935.

Nabawa and *Bencubbin* were also subjected to careful selection, as these two varieties show some undesirable variations, especially in height and maturity.

A detailed description of selection for quality within the varieties has been given in the July issue of the *Journal*. This is a sideline of pure seed production, being an endeavour to isolate the highest quality strain of each variety.

The long rows, which form the second year of the pure seed programme, produced a heavy yield of grain of high standard, thus enabling a large area of "stud"

seed to be sown this year. Likewise, the "stud" plots also yielded well, so that, given normal conditions, a reasonable quantity of seed of the most important commercial varieties should be available for distribution for the seeding of 1935.

WHEAT VARIETY TRIALS.

In reporting on the variety trials conducted at the College last year due cognisance must be taken of the system in operation over the past five years. Last year's results actually form the culmination of a scheme which was inaugurated in 1928, when the intention was to determine the relative yielding ability of the many numerous varieties under cultivation in the State. There is no question that there are far too many varieties grown in South Australia, and a more intelligent choice should ultimately increase the State average yield. The idea which prompted the scheme originally aimed to illustrate the advantage of some varieties over others, in the hope that conclusive evidence would gradually eliminate all inferior varieties and increase the area devoted to those which will give higher and more reliable returns per acre.

The objective was, firstly, to illustrate the relative merits of certain varieties under College conditions which are typical of conditions in the better class Mallee soils of the State; and, secondly, to show the incapacity for yield of certain varieties which are fairly extensively grown.

The secondary objective, viz., of eliminating undesirable varieties, has been completed with the results of last season. During 1928-30, 58 varieties of wheat were sown in the yield trial. In succeeding years those which came or which were likely to come into general cultivation were added to this list and tested. In all 77 varieties, as well as numerous crossbreds and selections, have been tested for one or more years. The net result is that since the inauguration of the trial only 10 of the 58 have survived.

The original scheme of testing was to grow each variety in three one-third acre plots, distributed at random throughout the field. This was done in order to minimise discrepancy in results, due to soil heterogeneity. From each of these blocks a hay cut was taken and the rest allowed to mature for grain and harvested for such. By averaging the yields from each plot and reducing to a per acre basis the yield per acre of both hay and grain was obtained.

In 1933 the method was changed somewhat, and five one-twentieth acre blocks were used for each variety. These blocks were about 8ft. wide and 4½ chains long. No hay was cut, the whole of the block being harvested for grain. In the future hay wheats will be tested separately, and dual purpose wheats will be included in both hay and grain trials. This method will save considerable labour and space. Five replications of each variety should give an even more accurate interpretation of its behaviour under field conditions than three replications, in spite of the fact that the size of the plots has been considerably reduced.

Statistics, specially devised for such purposes, have illustrated that the yield test experiment, as conducted at the College last year, was remarkably accurate. The standard error for the experiment was only 42lbs. per acre in the case of late varieties and 59lbs. per acre in that of early and mid-season varieties. This means that on the figures for 1933 for the late group, if one variety outyields another by 84lbs. per acre (or twice the standard error) it may be considered as a significantly better variety, and the chances are about 30 to 1 that, under similar conditions, it would outyield the second variety again. If one variety significantly outyields another over three or more years we can definitely state that it is a superior variety. The use of statistics in field tests may appear to be superfluous, but it safeguards against making incorrect conclusions, and gives a measure of reliability to the tests.

TABLE I.—*Summary of yields of varieties tested* 1928-33 *and of all varieties tested in* 1933.

Variety.	1928.		1929.		1930.		1931.		1932.		1933.		Mean 1928-33.		Position 1928-33.	Position 1933.
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.		
Nawab	25	25	15	2	15	15	29	1	25	18	34	28	24	5	1	1
Sword	28	51	16	27	16	16	21	30	27	37	33	16	23	50	2	2
Waratah	22	25	16	40	12	49	23	46	19	13	32	40	21	16	3	3
Florence	23	15	11	13	16	34	23	52	24	19	25	44	20	50	4	12
Regent	23	42	13	28	14	8	22	44	21	39	27	32	20	32	5	7
Nabawa	22	9	12	58	12	19	19	2	24	46	26	16	19	35	6	11
Currawa	19	43	13	58	14	32	17	23	25	10	24	36	19	14	7	16
Sirdar	21	13	13	53	11	6	20	10	16	15	28	40	18	33	8	5
Gallipoli	18	53	10	20	12	7	19	26	24	36	24	48	18	22	9	14
Ford (R.A.C.)	19	3	15	23	7	22	17	48	20	42	27	25	17	57	10	9
Gluyas (R.A.C.)	—		—		—		—		—		31	16	—		—	4
Ex Fay 8	—		—		—		—		—		27	44	—		—	6
Bencubbin	—		—		—		—		—		27	32	—		—	7
Nabawa x Gluyas Q.O. 98	—		—		—		—		—		26	40	—		—	10
D.G.H.	—		—		—		—		—		24	56	—		—	13
Collection	—		—		12	7	18	31	25	14	24	40	—		—	15
Nabawa x Bunyip	—		—		—		—		—		22	28	—		—	17
Nabawa x Gluyas Q.O. 29	—		—		—		—		—		20	20	—		—	18
Faun 3	—		—		—		—		—		18	8	—		—	19

In Table I. the results for 1933 are shown, together with results from past seasons, for those varieties which have been tested since 1928. It will be seen that a few of the newcomers, particularly Gluyas (R.A.C.), Ex Fay 8, and Bencubbin gave yields superior to those of some of the established varieties. These will be subjected to further yield tests in an endeavour to substantiate these results.

Unfortunately the practice in the past has been to group all varieties together, irrespective of the time of maturity. This detracts somewhat from the value of the results. For this reason the summaries in Table II. *et seq.* have been divided into early, mid-season and late groupings, and the varieties placed into their respective groups and compared with the standard variety for that group.

This year varieties have been grouped together according to maturity and the groups sown at the correct time. By this method a more direct comparison will be obtained, and farmers in the late districts, for example, will be able to compare more readily the behaviour of varieties which are common to their districts.

SUMMARY OF 1933 RESULTS.

Nawab was again the leading variety, closely followed by Sword and Waratah. Gluyas (R.A.C.) was promising. Others to show to advantage were Sirdar, Ex Fay 8, Bencubbin, Regent and Ford. Florence was disappointing, shattering largely accounting for the poor yield. The late maturing varieties, such as Gallipoli and Currawa, were sown too late to give their best yields. None of the crossbreds was outstanding. The severe finish was responsible for a substantial decrease in yield, particularly with the late varieties, but it was gratifying to see Waratah yielding so well under adverse finishing conditions. One of the criticisms previously levelled at Waratah was that it lacked the capacity to finish well under such conditions, but last season did not substantiate this hypothesis.

Grouping the varieties into mid-season to late and early to mid-season groups and applying the analysis of variance method to interpret the results statistically, the following conclusions were arrived at:—

1. *Late Group.*—Nawab is by far the best yielder in the group. Sirdar is not significantly better than D.G.H., Gallipoli, Collection and Currawa, between which varieties there is no difference.

2. *Early and Mid-Season Group.*—There is no difference between Sword and Waratah, although the former is significantly better than Gluyas (R.A.C.). These three varieties are all superior to Ex Fay 8, Regent, Bencubbin and Nabawa x Gluyas Q.O.98, between which there is no difference. Bencubbin is superior to Nabawa, which is about equal to Florence. Nabawa is not significantly superior to Nabawa x Hurst's 2, but the crossbreds Nabawa x Bunyip and Nabawa x Gluyas Q.O.29 are denfitely inferior, and Faun 3 is a failure.

Summaries of the yield test for 1928-1932 (inclusive) are given on Table II. *et seq.* These tables are more or less self explanatory, and the performances of any of the varieties tested can be compared with that of the standard variety for its group.

TABLE 2.—*Summary of Yield Tests of Varieties Rejected in* 1932.—*Compared with Standards.*

Variety.	1928.		1929.		1930.		1931.		1932.		Mean, 1928-32.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Early Group—												
Waratah (Standard) .	22	25	16	40	12	49	23	46	19	13	18	59
Gluyas..............	23	52	16	48	14	19	22	7	16	41	18	45
King's White	19	47	17	23	11	2	27	16	15	18	18	9
Canberra	19	47	13	32	15	3	25	25	16	27	18	3
Sultan	21	6	17	31	9	23	23	15	13	54	17	2
Mid-season Group—												
Nabawa (Standard) ..	22	9	12	58	12	19	19	2	24	46	18	15
Gluford	24	9	13	11	12	49	19	20	27	12	19	20
Felix	19	23	14	2	14	26	22	13	19	32	17	55
Sirdar	21	13	13	53	11	6	20	10	16	15	16	31
President	18	16	17	45	8	35	22	50	14	13	16	20
Crostan	19	5	16	32	6	46	17	11	19	19	15	47
Late Gluyas	20	16	13	27¾	10	30	15	13	18	55	15	40
Caliph	20	50	14	45	9	23	22	26	9	59	15	26
Late Group—												
Ford (Standard)......	19	3	15	23	7	22	17	48	20	42	16	16
Dan	18	5	15	2	10	24	19	8	21	53	16	54
White Essex.........	16	43	12	45	8	4	14	30	24	57	15	24
Leake's Rustproof....	16	2	13	54	7	40	12	15	22	38	14	16
											Mean, 1930-32.	
Nabawa (Standard) ..	—		-		12	19	19	2	24	46	15	22
Danly	—		—		11	0	20	22	21	59	17	47
Kington	—		—		11	31	20	53	18	53	17	6
Noongar	—		—		15	27	19	58	13	42	16	22
Sulland	—		—		10	54	17	5	10	56	12	58
											Mean, 1931-32.	
Nabawa (Standard) ..	—		—		—		19	2	24	46	21	54
Dalton..............	—		—		—		24	41	19	33	22	7
Gluclub	—		—		—		20	35	21	46	21	11
Improved Gluyas	—		—		—		18	13	14	59	16	36
Cowbort	—		—		—		—		15	43	—	

TABLE III.—*Summary of Yields of Varieties Rejected in* 1931.—*Compared with standards.*

Variety.	1928.		1929.		1930.		1931.		Mean 1928-31.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Mid-season Group—										
Nabawa (Standard)	22	9	12	58	12	19	19	19	16	41
Dawn	21	10	17	14	11	12	19	45	17	20
Caird	24	28	14	6	8	29	16	9	15	48
Bordan	23	37	11	49	9	47	17	23	15	39
White Tuscan	16	43	12	45	8	4	14	30	13	1
Late Group—										
Ford (Standard) ..	19	3	15	23	7	22	17	48	14	54
Forel...............	24	44	10	50	12	25	19	20	16	50
Federation	11	51	14	36	7	35	13	59	12	00
Huguenot	9	48	9	50	9	48	6	59	9	[illegible]
Fondling	—		—		—		17	29	—	

TABLE IV.—*Summary of Yields of Varieties Rejected in 1930.—Compared with standards.*

Variety.	1928.		1929.		1930.		Mean 1928-30.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Early Group—								
Waratah (standard)	22	25	16	40	12	49	17	18
Baldmin	21	28	10	37	13	14	15	6
Mid-season Group—								
Nabawa (Standard)	22	9	12	58	12	19	15	49
Gloss	19	51	16	10	12	13	16	5
Faun	20	42	13	57	13	7	15	55
Fay	19	28	15	30	10	42	15	10
Daphne	18	57	13	15	10	30	14	14
Rajah	17	15	12	36	12	0	13	57
Regal	15	55	16	14	6	58	13	2
Minister	18	56	10	41	8	23	12	40
Begum	12	34	13	41	9	54	12	3
Glede	14	7	13	15	7	16	11	33
Maharajah	14	30	12	6	8	53	11	5
Late Group—								
Ford (Standard)	19	3	15	23	7	22	13	56
Baroota Wonder	21	41	12	40	12	31	15	37
Indcret	19	15	15	32	10	14	15	00
Joffre	21	40	11	23	11	42	14	55
Walker's Wonder	20	57	12	36	10	29	14	41
Mac's White	18	22	15	44	8	23	14	10
German Wonder	16	56	12	15	8	5	12	25
Yilma	17	1	10	33	8	53	12	9
Major	15	43	12	2	7	46	11	50
Canaan	16	29	10	58	7	22	11	36
Wannon	16	16	10	3	8	4	11	28
Zealand Blue	14	17	11	1	8	29	11	16
Turvey	13	51	12	58	6	40	11	10
Onas	11	54	12	41	7	22	10	39
Yandilla King	15	8	10	3	6	15	10	29
Nizam	13	51	9	50	6	58	10	13
Wardfir	14	46	10	3	5	45	10	11
Ranee	—		14	6	11	13	12	40
Sepoy	—		14	45	12	31	13	38
Triumph	—		13	41	10	6	11	54
Captain	—		11	58	10	6	11	2
Finch	—		—		9	45	—	
Marshall's 3B	—		—		8	59	—	
Satisfaction	—		—		7	41	—	

In some instances it will be seen that a variety which was superior to the standard in yield has been rejected. This is due to the fact that it possesses some very undesirable character, such as weak straw, poor grain samples, or some other defect. The low yield of Ford in 1930 cannot be considered as typical of the variety, and it is assumed that some small discrepancy in results escaped detection. Given a normal yield in this year Ford would occupy a much higher position than is shown in the summary.

Oat Variety Trials.—Results of trials with varieties of oats from 1928-32 (inclusive) are appended in Tables V. and VI. It will be seen that the popular variety, Algerian, leads in the hay trials, but Early Kherson, Early Burt and others have given more satisfactory results for grain.

TABLE V.—*Summary of Hay Yields of Oat Varieties* 1928-32, *inclusive.*

Variety.	1928.			1929.			1930.			1931.			1932.			Mean		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
Algerian	2	11	22	1	13	59	1	17	23	2	17	102	2	17	75	2	7	56
New Zealand Cape	2	15	107	1	11	9	1	19	7	2	16	33	2	11	81	2	6	92
Early Kherson .	2	15	106	1	16	108	1	19	7	3	0	86	2	7	0	2	5	106
Warrigal	2	6	61	0	19	75	2	6	56	3	5	53	2	8	31	2	5	33
Sunrise	2	11	98	1	11	48	1	13	82	2	16	47	2	11	53	2	4	110
Smyrna	2	6	101	1	3	59	2	0	20	2	19	73	2	4	78	2	2	111
Guyra	1	16	2	1	5	105	2	2	18	2	16	20	2	10	44	2	2	15
Early Burt	2	13	0	1	5	66	1	18	8	2	9	95	2	2	12	2	1	81
Palestine	2	5	21	0	18	31	1	17	106	2	18	87	1	10	20	1	18	8

Summary of Hay Yields of Oat Varieties Rejected in 1931.—*Compared with Standard.*

Variety.	1928.			1929.			1930.			1931.			Mean		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
Algerian (Standard)	2	11	22	1	13	59	1	17	23	2	17	102	2	4	108
Scotch Grey	2	9	5	1	6	88	1	14	81	2	5	57	1	18	86

Summary of Hay Yields of Oat Varieties Rejected in 1930.—*Compared with Standard.*

Variety.	1928.			1929.			1930.			Mean.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
Algerian (Standard)	2	11	22	1	13	59	1	17	23	2	0	72
Imbros Island	2	14	91	0	17	0	1	19	35	1	17	83
Lachlan..............................	2	12	49	1	1	110	1	16	52	1	16	108
Kherson	2	7	76	1	1	110	1	17	92	1	15	93
Kelsall's	2	4	44	1	3	97	1	15	66	1	14	69
Calcutta	2	14	66	0	17	19	1	16	37	1	9	41

Summary of Hay Yields of Oat Varieties Rejected in 1929.—*Compared with Standard.*

Variety.	1928.			1929.			Mean.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
Algerian (Standard)	2	11	22	1	13	59	2	2	41
Yarran	2	10	108	1	4	5	1	17	57

TABLE VI.—*Summary of Yield Tests of Oat Varieties* 1928-32, *inclusive.*

Variety.	1928.		1929.		1930.		1931.		1932.		Mean.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Early Kherson	45	28	27	36	25	2	35	26	34	23	33	31
Palestine	46	4	28	21	22	1	46	24	19	35	32	25
Early Burt	47	3	25	39	26	4	31	26	29	7	32	0
Smyrna	31	29	22	37	33	17	35	14	27	9	30	5
Warrigal	47	18	18	30	26	10	30	10	25	1	29	22
Guyra	30	37	27	30	29	37	27	0	31	23	29	17
Algerian	29	0	26	12	25	17	22	9	42	15	29	3
Sunrise	52	0	18	24	16	12	18	14	39	27	28	39
New Zealand Cape ...	26	1	26	18	23	23	19	12	31	7	25	12

Summary of Yields of Varieties Rejected in 1931.—*Compared with Standard.*

Variety.	1928.	1929.	1930.	1931.	Mean.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
Algerian (Standard)	29 0	26 12	25 17	22 9	25 30
Scotch Grey	28 32	24 28	28 3	20 33	25 24

Summary of Yields of Varieties Rejected in 1930.—*Compared with Standard.*

Variety.	*1928.	1929.	1930.	Mean.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
Algerian (Standard)	29 0	26 12	25 17	26 36
Kherson	25 17	23 16	23 23	24 5
Calcutta	30 20	13 31	25 17	23 9
Lachlan	32 23	13 12	19 3	21 26
Kelsall's	29 22	19 9	6 12	18 14
Imbros Island	18 30	12 39	22 10	18 0

Summary of Yields of Varieties Rejected in 1929.—*Compared with Standard.*

Variety.	1928.	1929.	Mean.
	Bush. lbs.	Bush. lbs.	Bush. lbs.
Algerian (Standard)	29 0	26 12	27 26
Yarran	17 34	16 27	17 10

It is fully realised that the oat crop is likely to extend considerably in South Australia, especially if more suitable varieties can be evolved, because, apart altogether from its value as a marketable commodity and as fodder in various forms, it has a definite place in our agriculture as a rotation crop. Apart from its grazing potentialities, which are great, it has its use on the farm as hay, grain, or silage, in all of which forms it is remarkably well adapted for conservation. An elaborate system of testing would be required if the relative merits of all varieties, taking into consideration all possible uses of the crop, were to be tested. Both grain and hay yields are of importance, but these alone are inadequate if the all-round desiderata of any variety are to be assessed. The grazing value is of particular importance, and from this point of view alone several factors require careful consideration. Rapidity of early growth, bulk of early vegatative growth, relative palatability, and last, but by no means least, powers of recovery all demand attention, and it is well known that varieties are very variably endowed with these attributes. To combine rapidity of early growth, bulk of early vegetative growth, good palatability, and excellent recovery power after grazing becomes the objective in breeding grazing oats. The position becomes more complicated, however, when the dictates of farmers' practice and requirements demand that such an oat must also have capacity to yield well for either hay or grain. The need is for a variety able to give satisfaction in all three respects.

There is, however, plenty of room for another class of oat variety. Some of the early maturing varieties, such as Palestine, for instance, are of especial value in that they may be sown on completion of wheat seeding. These fall into a separate category, for their grazing worth needs no consideration, and selection for such types aims at isolating rapid maturing, sparse stooling, thrifty types possessing good straw and panicle characters. Such types require testing as a separate group; they should not be compared with dual purpose varieties, such as Algerian and Early Kherson. In fact, farmers failing to discriminate between varieties may

seriously misinterpret the value of other oats for grazing by growing a good grain-yielding type of the group under discussion, such as Palestine, which is notoriously poor as a grazing oat, with minimum recuperative ability.

The foregoing actually summates the basis of work being undertaken with oats at the College, and during the present season grain, hay, and grazing characters are entering into the tests and trials of oat varieties.

SEEDING LISTS FOR 1934 SEASON.

The wheat varieties to be tested in the field replicates in the 1934 season are:—Baringa, Dundee, Ford (R.A.C.), Ford, Gallipoli, Bobin, Nabawa, Ranee 4H, Sultan, S.H.J., Minflor, Nawab, Sword, Florence, Waratah, B.F.G. 3003, Aussie and Merridin, Minflos and True Gluyas. Strains of Gluyas and Ford will also be tested against each other.

It will be noticed that there are a number of newcomers in the trial, and the behaviour of varieties such as Dundee, Baringa, Bobin and S.H.J., which are receiving a good deal of attention, will be watched with interest. The College is also endeavouring to test the common high quality wheats in order to determine which varieties possess the highest potential yield. High and medium quality wheats in this year's trial are Dundee, Ford, B.F.G. 3003 (a promising Queensland introduction), Aussie and Merridin, Minflos and S.H.J.

Oat varieties under review include Algerian, Guyra, Belar, Early Kherson, Early Burt, Sunrise and Fulghum.

The plots have been further reduced in size, and this season five one-fortieth acre plots will be sown to each variety. All possible precautions are being taken to minimise border effect, and the plots have been planned so that the sowing and harvesting may be done with a minimum of labour. Investigations have shown that plots of one-fortieth acre give results equally reliable as those from a bigger area.

Pending results from the hand plots, where they will be systematically tested for yield, no crossbreds have been included in this year's variety trials, and crossbreds will be grown in the field trials only when they have given a consistently good performance in the hand plots.

In all trials the efficient utilisation of time and labour is the objective, and no consideration will be given to any variety approaching mediocrity. Rigorous rejection is necessary if reliable results are to be obtained, and any variety which survives in the field trials to be conducted at the College must necessarily possess all those characters which would render it suitable and acceptable for general cultivation.

PASTURE IMPROVEMENT.

Experiments and Demonstrations Conducted in Co-operation with the South Australian Committee of the Australian Dairy Council.

[By R. C. SCOTT, Supervisor of Experimental Work.]

Early in 1931 arrangements were finalised under which the Department of Agriculture agreed to co-operate with the South Australian Committee of the Australian Dairy Council in a series of experiments designed with the object of economically improving the quality and quantity of pasturage available in the dairying districts of the State.

Under this arrangement a wide programme of work has been planned and has expanded from year to year until at the present time it embraces:—

A. Pasture variety investigations.
B. Pasture mixture investigations.
C. Pasture strain investigations.
D. Pasture manurial investigations.
E. Rotational grazing investigations.
F. Pasture demonstrations.
G. Pasture and Pasture Conservation Competitions.

In order to commence operations, dairymen were circularised inviting applications from those willing to assist in the detailed operations which are so essential if reliable information is to be obtained. The Committee undertook to supply the necessary seed and manure and, in a few cases where grazing records were required, they also assisted with the fencing material, whilst in return the experimenter selected provided all labour, kept particulars of the results obtained, and forwarded periodical reports indicating the progress of the trials. As often as circumstances permitted, Officers of the Department have inspected the plots, whilst members of the South Australian Committee have made an annual inspection of the more important trials.

PASTURE VARIETY EXPERIMENTS.

A collection of varieties has been planted at a number of centres, and the following men are co-operating with the Committee in this work:—

J. Fisher	Gladstone
F. Coleman	Saddleworth
W. S. McAuliffe	Eudunda
T. W. Roenfeldt	Greenock
W. T. Vigar	Eden Valley
A. E. D. Francis	Bugle Ranges
F. Keen	Meadows
D. F. Sheppard	Prospect Hill
J. B. E. Wright	Meningie
J. A. Carruthers	Narrung
J. H. Goyder	Long Flat, Murray Bridge
A. C. Kemp	Hatherleigh
W. K. Chambers	Mount Gambier
A. Leech	Warunda, Port Lincoln

Each pasture has been planted as a pure stand in small plots (generally speaking, about 1 square chain in area) in order to ascertain the type most suited to the soil and climatic conditions obtaining in the locality. In the poorer lands the seeding of a clover in conjunction with the grasses would, no doubt, have been of advantage, so far as the development of the latter is concerned, but at the

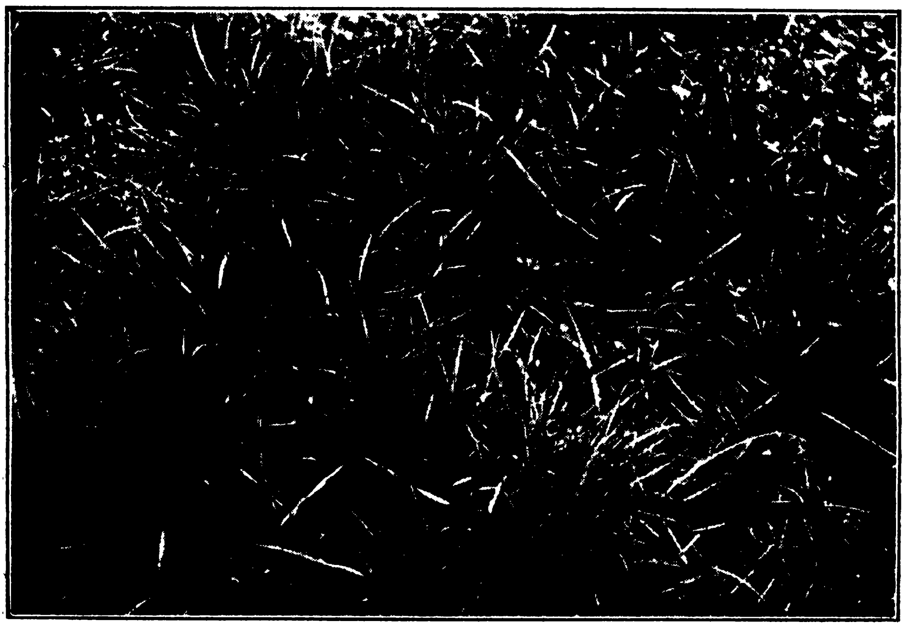
same time sufficient growth was made to allow for the forming of an opinion regarding their relative value. It does not appear necessary to give full particulars of all centres and all varieties tested, but information concerning the most useful is set out below.

Subterranean Clover (Mount Barker Strain).

This is far and away the most important leguminous pasture plant in this State, and in all plots situated in districts enjoying an annual rainfall exceeding 20 inches it made much superior growth to any other clover. It thrived in a great variety of soils, but is particularly dependent on adequate dressings of phosphatic fertiliser.

Subterranean Clover (Dwalganup Strain).

Although not yet fully tested, this early ripening strain offers great possibilities, as the legume which will fill the requirements of the 12 to 20 inch annual rainfall country. In the red lands of the North, in plots at Saddleworth, Eudunda, and Gladstone, it has made satisfactory growth; whilst in the Lakes area, namely, at Narrung, it showed to considerable advantage. So far as the sandy land of the latter district is concerned, this strain of Subterranean clover exhibited great



A good pasture mixture, comprising Perennial Rye grass and White clover.

promise, and can be confidently recommended for trial, not only in the localities mentioned, but throughout the agricultural areas generally. Its advantage lies in the fact that whereas the ordinary type Subterranean clover demands damp, late Spring conditions for full maturity of the grain in order that the plants can make provision for a new crop in the following year, the Dwalganup type matures its grain some weeks earlier, and thus escapes the adverse conditions generally experienced in late October and November in the 15 to 20 inch rainfall areas. In growth characteristics the early type is not as leafy as the Mount Barker strain, and, consequently, from a pasture point of view would never be seeded unless the climatic conditions rendered such planting necessary.

White Clover.

Two strains of white clover have been tested, namely, Certified New Zealand and Kentish Wild White. Neither has shown to particular advantage on our pasture lands generally, but of the two, the former appears to be the better type so far as the grazing of dairy cattle is concerned. At Eden Valley the Kentish has proved relatively persistent, but has not made any bulk of growth and tends to lie close to the ground. On the other hand, the New Zealand strain is a much stronger and more leafy grower.

The results obtained indicate that moist conditions and fertile soils are essential for this clover, otherwise it fails to make headway and does not persist throughout our long, dry summers. The best stands have occurred in the rich lands of the Murray Swamps, Mount Gambier, Mount Barker, and Mount Compass, and consequently it cannot be recommended for general planting throughout the pasture areas of the State. However, each field must be considered according to the conditions offering, and in many localities the inclusion of Certified New Zealand White Clover in the seed mixture to be planted in the richer, damper gullies would be of advantage.

Red Clover.

Very little in favour of this clover can be reported, as in most cases the plots seeded failed entirely. The exceptions were those on the Murray Swamp lands and at Dingabledinga. In the trials at the latter centre the Montgomery strain was planted. This type made strong, luxuriant growth, despite the fact that the soil was of low fertility, and, consequently, it is worthy of further testing. However, on the whole, Red Clover has not shown to advantage in these experiments.

Strawberry Clover.

This is a variety demanding special conditions, and, consequently, it is not surprising to find that in the majority of plots situated throughout the State the plants have failed to make headway. In those situated at Hatherleigh, where the soil is wet and of the black, sea mud type, Strawberry Clover was the best leguminous pasture variety, whilst in a damp gully at Meadows it has also done well. The results obtained indicate that in swampy locations, including those containing an appreciable quantity of salt, this clover is able to thrive, making strong growth of palatable fodder, but the planting should be confined to such areas, and it is not of particular value in the State as a whole.

Clustered Clover.

This annual clover has done well throughout the plots generally, although in the higher rainfall areas it has not yielded the same abundance of fodder as some of the other varieties. However, it is well suited to those districts in which the annual rainfall lies between 16 and 20 inches, and has given first class grazing returns at Nuriootpa, Eudunda, Saddleworth, Narrung, etc.

Lucerne.

In these trials lucerne has been seeded as a grazing crop. In the Adelaide Hills generally, and also the South-East, attack by lucerne flea has militated against the establishing of lucerne, but even where a good stand has been obtained it has not shown to advantage as a pasture plant. However, at Meningie and Narrung lucerne seeded on the sandy lands has yielded more grazing than any other variety, whilst in the plots situated in the agricultural areas north of Adelaide, and also of Southern Eyre's Peninsula, it has done extremely well.

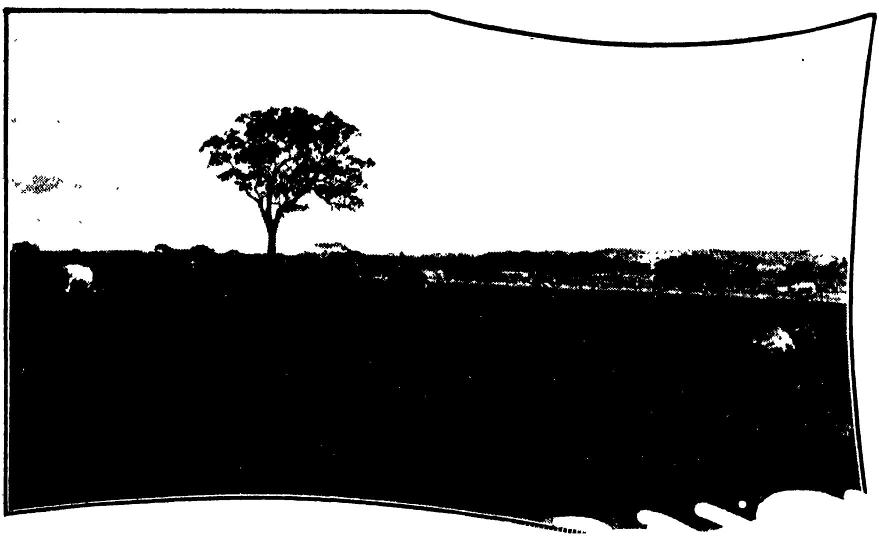
Perennial Rye Grass.

So far as this fodder is concerned, it is important to see that the best quality of seed available is utilised so as to ensure the production of leafy plants, possessing true perennial habits. Unless certified seed or grain which, to one's own

knowledge, has been harvested from old pasture stands, is planted, there is a danger that stemmy type plants will be produced which, in the course of two or three years, will die out despite the character of the soil or the climatic conditions experienced. The best Perennial Rye Grass plots have been those situated in areas in which the annual rainfall exceeds 20 inches and in which the soil is of a fertile nature. Under such conditions Perennial Rye Grass can be recommended, but it is a fodder demanding high fertility and, therefore, should always be seeded in conjunction with clover and liberally manured.

Wimmera Rye Grass.

Viewing the results from the point of view of the pasture areas as a whole, Wimmera has proved the most valuable grass included in the variety trials. Being a free seeding annual, it is not liable to extinction by a long, dry summer, whilst, unlike many other annual plants, it is readily consumed by livestock when in a dry state. Wimmera Rye Grass is particularly drought-resistant, and is able to flourish



Manurial Experiments on the property of Mr. George Cleggett, Mount Barker.

in much less fertile soils than Perennial Rye Grass. At Warunda, on Eyre's Peninsula, strong growth was made when seeded in very poor, shotty, ironstone country. In addition, it has done well in the lighter sandy land of the State, whilst it has also responded under favourable soil and climatic conditions. Comparatively with good stands of Perennial Rye Grass, it possesses the disadvantage of making more stemmy growth, not remaining green as long in early summer, not responding with fresh growth after every rain during the summer, and not making such rapid headway after the opening of the season in autumn. Nevertheless, under average conditions it is the best grass and would only be displaced by Perennial Rye Grass, *Phalaris tuberosa,* or Cocksfoot in the more favourably situated areas in the South-East and Adelaide Hills.

Phalaris tuberosa.

In these variety trials, *Phalaris* has proved a very useful fodder, but has made better growth and crowns in the heavier, more fertile soils than in the lighter, sandier land. Its chief feature has been its ability to withstand hard grazing and make rapid growth after the opening rains in autumn. Another important point which has been well illustrated in several instances is the necessity for thorough preparation of the soil if the variety is to be successfully established. The young

plants appear to be particularly susceptible to competition in the first few weeks of their existence, and are easily crowded out by weeds if a clean seed bed is not available. Providing that precautions of this nature are taken, *Phalaris tuberosa* may be recommended for extensive planting. It is very drought-resistant and has done fairly well under a 17 inch rainfall at Eudunda, but prefers heavy soils to those of a light nature.

Cocksfoot.

The most valuable of the remaining fodders is Cocksfoot, and of the various strains the Akaroa type has made the best pasture. This variety requires high rainfall conditions and has done well on the rich reclaimed soils of the Murray Swamps, although at the same time it has thrived in some of the lower fertility soils of the Adelaide Hills. As yet little has been done with Cocksfoot, but it is a variety worthy of more extensive trial in the wetter areas.

The pastures which have been discussed are the most important in the variety trials, but others included in the plots are Sheeps Burnet, *Danthonia pilosa*, Chicory, German Tall Fescue, Primrose, Timothy, Fox Tail, Crested Dogs Tail, Prairie Grass, and Meadow Fescue. However, none of these has shown to particular advantage and do not appear likely to prove of value.

PASTURE MIXTURES.

The pasture mixtures which have been planted as experimental plots and the centres at which they are located are as follows:—

Pasture Mixture.	Experimenter.	Centre.
Wimmera Rye Grass Subterranean Clover	W. T. Vigar A. E. D. Francis D. F. Sheppard F. Keen	Eden Valley Bugle Ranges Prospect Hill Meadows
Wimmera Rye Grass Early Subterranean Clover	F. Coleman W. S. McAuliffe T. W. Roenfeldt	Saddleworth Eudunda Greenock
Wimmera Rye Grass Lucerne	F. Coleman T. W. Roenfeldt J. A. Carruthers	Saddleworth Greenock Narrung
Perennial Rye Grass Subterranean Clover	W. T. Vigar F. Keen	Eden Valley Meadows
Perennial Rye Grass White Clover	A. E. D. Francis D. F. Sheppard	Bugle Ranges Prospect Hill
Perennial Rye Grass White Clover Subterranean Clover	Geo. Cleggett	Mount Barker
Phalaris tuberosa Perennial Rye Grass Strawberry Clover	A. C. Kemp	Hatherleigh
Phalaris tuberosa Subterranean Clover	W. T. Vigar A. E. D. Francis F. Keen D. F. Sheppard	Eden Valley Bugle Ranges Meadows Prospect Hill

Probably the best plot is that on the property of Mr. A. E. D. Francis at Bugle Ranges. This district has an annual rainfall of approximately 30 inches. The field planted possesses fairly good quality soil, but is not of the highest fertility. It is situated on the lower slopes of a relatively steep hill and has an easterly aspect, thus being fairly well sheltered from extremely cold conditions. Planting took place in 1932, 10lbs. of Certified Perennial Rye Grass and 5lbs. of White Clover seed, together with 2cwts. of superphosphate, being applied per acre. The field has been regularly grazed with cattle, whilst toward the end of last year the pasture was allowed to develop for hay and ultimately yielded 2 tons per acre. When both

the grazing and hay returns are taken into consideration, the annual yield from this pasture has been sufficient to maintain three-tenths of a cow per acre per annum and in the same year produce 1 ton of hay per acre.

In view of the fact that the pasture is only two years old, this is a very satisfactory figure, and, consequently, it is a mixture which can be recommended for conditions similar to the above.

On the other hand, the White Clover at Eden Valley, where the rainfall is from 4 to 5 inches lighter, did not persist; whilst on the poorer land of Meadows and Prospect Hill it has not made full development. Under such circumstances the addition of Subterranean Clover in place of the White Clover has overcome the difficulty, and a really good pasture secured.

In the manurial trials on the property of Mr. George Cleggett at Mount Barker a valuable stand of pasture has been obtained by including both these clovers with the Perennial Rye, whilst a little *Phalaris* was also added.

For average soil and climatic conditions in the Adelaide Hills a Wimmera Rye Grass-Subterranean Clover mixture can be recommended, and in at least one instance in these experiments an average grazing return exceeding half a milking cow per acre per annum was secured. In this connection 8 to 10lbs. of Wimmera

Phalaris and Subterranean clover hay.—A. E. D. Francis, Bugle Ranges.

Rye Grass and 6 to 8lbs. of Subterranean Clover seed should be sown if full returns are expected in the first year. However, if seeding at this rate cannot be afforded, the quantities may be approximately halved when the grower will be dependent upon the free re-seeding habits of these two fodders for thickening up the stand in the following year.

In the plots at Saddleworth, Eudunda, and Greenock, where the rainfall is lower but the soil fertile, the early strains of Subterranean Clover (Dwalganup) and Wimmera Rye Grass has made a satisfactory mixture. In this case 4lbs. of seed of the former and 6lbs. of the latter is ample. In those plots in which lucerne has been substituted for Dwalganup Subterranean Clover, the mixture has not been so successful. So far as the wet, black lands of Hatherleigh are concerned, the combination of Perennial Rye Grass (10lbs.) and Strawberry Clover (4lbs.) planted on the property of Mr. A. C. Kemp has led to the production of a dense mat of fodder and promises excellent results.

When properly established one of the best mixtures has been *Phalaris tuberosa* and Subterranean Clover, but experience has indicated that if a good stand is to be expected the seed of the *Phalaris* should be sown alone in the first year and the land to be planted very thoroughly prepared. In the following season the Subterranean Clover may be lightly cultivated in.

The seeding rates adopted under this method have been 4lbs. per acre of *Phalaris* and 6lbs. per acre of clover. Last year Mr. Francis at Bugle Ranges cut 3 tons of hay per acre from a plot laid down on these lines, and in addition secured a limited amount of grazing. In connection with the establishment of *Phalaris* it is interesting to record that a plot planted with seed has developed into a better stand, and with better crowned plants than an adjoining field planted at the same time with rooted sections. Provided the field is planted in the method recommended the above mixture promises to prove very successful in the heavier lands of the Adelaide Hills and South-East. However, so far as pasture mixtures are concerned, no definite recommendation regarding the best type can be made as everything depends upon the location and soil characteristics of the field to be planted.

Mr. W. T. Vigar's cattle grazing on a mixture of *Phalaris* and Subterranean clover at Eden Valley.

PASTURE STRAIN EXPERIMENTS.

Within comparatively recent years attention has been directed towards the importance of strains that occur in the different pasture species. Some of these variations are a distinct improvement upon the remainder, either from the point of view of the quality of the fodder (that is to say, more leafy in type) or better suited to special climatic or soil conditions. There is, therefore, work for the plant breeder to do in isolating and building up strains possessing such desirable characters until ultimately supplies of seed are available for distribution amongst growers in the pasture areas. Such work is in progress at Kybybolite Experimental Farm, under the control of the Manager, Mr. L. J. Cook, who is assisted by Mr. J. D. McAuliffe. The report prepared by Mr. Cook on these investigations is submitted below:—

"The plots of grass strains established in 1932 were maintained under field conditions throughout the season. Monthly notes were taken on their growth and general health. During the latter half of July careful examination of the winter growths of Perennial Rye strains were made and 122 individual plants pegged and noted. Fifty-nine of these were strains of New Zealand origin, 33 from Victorian, 28 from South Australian, and 2 from English origin. These plants were watched and noted during the rest of the season at various intervals.

All plots were grazed off short in mid-October. The subsequent summer growth of the ryes was somewhat poor on account of the light spring and early summer rains. However, at the completion of growth a further selection of plants was made, judged principally on the summer growth produced. Fifty individual plants were pegged, including 24 of New Zealand, 12 of Victorian, and 14 of South Australian origin.

It was noted that so far as Perennial Rye Grass plants were concerned, those plants which showed as good producers of winter grass were not always producers of good summer grass. However, some very nice leafy types of plants have been selected, and when observations have been continued over a number of seasons, it is hoped to isolate the most productive and persistent strains under our climatic conditions.

A small attempt was made to collect seed from a few of the better type plants, calico, glass fabric, and celaphone being tried as protection against cross-fertilisation by inferior plants. Where two plants of comparative equal type and quality were growing in close proximity they were covered together to allow for pollination. On account of the severe dry period experienced after the spring grazing, the plants seeded rather poorly and very little seed was secured from the isolated plants of Perennial Rye. A little from three strains was secured. The Perennial Rye Grass plots generally suffered by the long, dry summer experienced, only 120 points of rain falling from 5/12/33 to 3/4/34. From the latest examination of the plots, it would appear that the death of these plants during this period has been from 7 to 10 per cent. Better seeding results were obtained from *Phalaris tuberosa* species and small packets of seed were obtained from three strains: one, an erect, leafy type of growth; another, a very fine and thick leafy type, with good complete crowns; and a third of a robust, persistent type of local strain. Comparatively, the *Phalaris* strains withstood the dry summer better than the Perennial Rye strains, there being only 6 per cent. of deaths amongst plants.

The seven strains of Wimmera Rye grass sown in 1933 made very good growth throughout the season and showed quite a mixed variation of type in their growths. There was quite a noticeable difference in the period of growth of some plants, and the amount of leaf to stem varied greatly. Thirteen of the best plants were covered before flowering and their seed collected separately. Three selections were made from the Appila strain, two each from the Hampstead strains, one from the Wayville, and one each from the Turretfield strains.

Seven strains of Subterranean Clover were grown in small plots, and showed quite distinctive differences in their period of growth, amount of leaf and stem development, and quantity of seed produced. Our local strain of Shepherd's seed was outstanding as the best yielder of both bulk of growth and seed produced. The type from Bacchus Marsh was the best of the others, whilst the early strain from Dwalganup and Daliak made very poor development. The strain of pinkish stemmed clover from Springhurst made quite a lot of growth, but lacked in leaf development, comparatively, to the amount of stem growth. Seed from all of these strains was collected for further trial.

Of the other species of grasses tried in small plots during 1933, they mostly made fair growth under protected conditions, but none showed to greater promise than the *Phalaris* and Ryes. Crested Wheat Grass, grown from seed supplied by the Waite Research Institute, made a very fair stand, and grew quickly following the autumn rains of this year. Seed was collected from this species, and a trial of this under field conditions will be made during 1934.

Tall Fescue made the best showing of the Fescues, and Prairie Grass was the best of the Bromes, but these would not appear to be successful under field conditions. Some germination of *Danthonia* species, supplied by the Waite Research Institute, was secured, and the development of those will be watched and noted during their second year of life.

WORK FOR 1934-5 SEASON.

Observations and notes will be continued to be made of the 1932 and 1933 sowings of Perennial Grasses, including several notes of all plots, and special notes on individually pegged plants. It is proposed to sow the annuals, Wimmera Rye and Subterranean Clover, again in fresh plots, and to sow the selections under isolated conditions. Three acres of fallow have been well prepared, and the selected Wimmera Rye will be sown in islands amongst drills of oats. The selected strains of *Phalaris tuberosa* will be planted in isolated positions in corners of other fields, where it can be hoped that they will not be subsequently affected by fertilisation from annual and inferior types of canary grass. A small quantity of netting and fencing may be required to protect these at certain periods, but we confidently hope to commence from these as a nucleus a supply of first quality selected seed.

I wish to record the good assistance and careful work done by Cadet J. D. McAuliffe."

PASTURE MANURIAL EXPERIMENTS.

Two series of permanent pasture manurial experiments are in progress, namely, one conducted by Mrs. C. Milne at Meadows, and the other by Mr. G. Cleggett at Mount Barker. In addition a number of miscellaneous trials have been made in the form of treating unfenced strips across various fields, but in this case any differences are simply a matter for observation. However, so far as the permanent plots are concerned, each field is fenced separately, and, therefore, a complete grazing or harvesting record is obtainable.

MISCELLANEOUS EXPERIMENTS.

Most of the demonstrations relate to the influence of applications of sulphate of ammonia, whilst at Narrung various treatments connected with the handling of lucerne pasture were tested. Whilst considerably increased growth of fodder followed the ammonia applications, it is very doubtful if such applications were economical. However, one very interesting fact has arisen from these demonstrations, namely, the influence of sulphate of ammonia in encouraging drought resistance in Perennial Grasses. This is no doubt connected with the development of a strong and extensive root system, and is particularly noticeable on strips of Perennial Rye Grass. These strips carry a greater number of plants per unit of area than the adjoining land treated with superphosphate only, whilst, moreover, at the present time these plants are better grown and of more leafy nature than those on the next blocks, despite the fact that no ammonia has been added for two seasons.

On the other hand, the area of Wimmera Rye Grass (an annual plant) which was fertilised in a similar manner, only showed benefit in the year of application, and to-day no differences can be observed. It would appear, therefore, that sulphate of ammonia may have some value in assisting in the successful establishment of perennial pasture stands.

The other miscellaneous experiments were planned with the object of indicating the best method of treating lucerne planted for grazing purposes on sandy soil in the Lakes district. Various manurial dressings and other treatments were tested, and in each season the influence of winter tillage was most marked. The plots stirred in winter (in this case by harrowing) yielded more and better quality lucerne than the adjoining plots receiving fertiliser but no tillage. Consequently, tillage appears to be more important than manure, but maximum results can be anticipated when both are applied, and the experiments conducted on the property of Mr. J. A. Carruthers at Narrung indicate that an application of 1cwt. of superphosphate per annum, together with winter cultivation, is the best treatment for lucerne pasture under such conditions. However, whether superphosphate is available or not, the crop should in all cases receive a light winter tillage if full lucerne yields are to be anticipated.

PERMANENT MANURIAL EXPERIMENTS.

In both series four treatments are being tested, and at Meadows each block is 4 acres in area and at Mount Barker 2½ acres. The scheme drawn up aims at determining the influence of varying quantities of superphosphate, the effect and correct time of applications of sulphate of ammonia and the value of a dressing of agricultural lime. As the work has only been in progress for a limited time, no conclusions are available, but in future years interesting records should be secured.

MEADOWS EXPERIMENTS.

The area utilised for experimental purposes consists of flat country which becomes very saturated during the winter months, whilst the soil is a fine, whitish silt overlying a yellowish clay subsoil. In its natural state it carried red gum timber, but in earlier times many of the larger trees had been removed, and until recently the land was thickly timbered with red gum suckers. Prior to being set aside for this experiment the field was planted with Perennial Rye Grass, Subterranean Clover, and White Clover, but to-day the latter variety has practically disappeared, and the pasture consists of the two first-named fodders, together with a considerable quantity of voluntary herbage. The returns secured are shown in the following table:—

Manure.	Yield Per Acre.							
	Grazing.		Hay.					
	1932.	1933.	1932.			1933.		
	Cow Days.	Cow Days.	T.	C.	L.	T.	C.	L.
2cwt. superphosphate	45·5	78	2	4	56	1	0	0
2cwts. superphosphate, 1cwt. Sulphate of Ammonia (Autumn)	48·5	92·25	1	7	84	1	2	56
2cwts. superphosphate, 1cwt. Sulphate of Ammonia (Autumn), 1cwt. Sulphate of Ammonia (Spring)	74·5	119	2	15	70	1	7	56
2cwts. superphosphate, 1 ton lime (1932)	89·25	114·25	2	10	7	1	5	0

The grazing period has been taken over the calendar year.

Whilst no conclusions are possible, some interesting observations have been made, and under the wet soil conditions autumn applications of Sulphate of Ammonia appear to depress plant growth, whilst dressings in spring (August) have encouraged strong development, particularly with regard to the Perennial Rye Grass. The addition of 1 ton of Lime in 1932 has resulted in the production of good pasture, well balanced with grass and clover, which has yielded steady grazing throughout the year. The hay yields in 1933 were disappointing, as the dry, hot weather of October and November checked all growth, and the ultimate returns were much less than those anticipated when the cows were removed in early spring.

MOUNT BARKER EXPERIMENTS.

Mr. Cleggett's property is situated at Mount Barker Springs, and is one of the oldest farms in the State. The soil is of good quality and the average rainfall 32 inches per annum. A 10-acre field which had previously carried an oat crop was selected and planted with the following pasture seed mixture in 1932:—

10lbs. Perennial Rye Grass per acre.
5lbs. White Clover per acre.
2lbs. Subterranean Clover per acre.
2lbs. *Phalaris tuberosa* per acre.

An excellent germination followed, and a good stand, in which all varieties were represented, has been secured. However, wet winter conditions delayed the erection of the sub-divisional fences, and it was not until the late winter of last year that grazing records were obtainable. The various annual manurings being tested from this trial are:—

Plot 1—1cwt. superphosphate
Plot 2—2cwt. superphosphate
Plot 3—2cwt. superphosphate
1cwt. sulphate of ammonia (Autumn)
Plot 4—2cwt. superphosphate
1cwt. sulphate of ammonia (Autumn)
1cwt. sulphate of ammonia (Spring).

As grazing results are only available from September 1st no appreciable differences can be anticipated. However, the grazing to date is equivalent to carrying 1 cow per acre for 117 days on Plots 1 and 2 and for 120 days on Plots 3 and 4.

ROTATIONAL GRAZING EXPERIMENTS.

The difficulty in experiments associated with rotational grazing is to provide a comparison so that any improvement due to this system of pasture management may be readily measured. In this connection arrangements have been completed under which Mr. R. Magor, of Monteith, will supply the records of production from his irrigation block both prior to the adoption of rotational grazing and after it is in full operation. Mr. Magor is now subdividing his swamp block of 60 acres into 20 fields, so that when all fences are erected the milking herd can be regularly depastured on young, leafy fodder of high feeding value. At the present time a little over 40 acres are under sown pasture, consisting of a mixture of Perennial Rye Grass, Prairie Grass, and White Clover, and except for a small block of lucerne, the balance will be seeded as soon as circumstances permit. The full area will receive two dressings of superphosphate annually, one in Autumn and the other in spring, both being at the rate of 1cwt. to the acre. All returns from the property will be recorded, together with the details of the additional expense incurred under this system, so that figures will be available comparatively with those secured in previous years. As the conditions on the reclaimed areas do not vary appreciably from block to block, the conclusions arrived at from this experiment should be of value to a large number of men with holdings along the river.

PASTURE DEMONSTRATION FIELDS.

Examination of the records from the purely experimental blocks has shown a great similarity in the results obtained, while the number of useful varieties is relatively limited. Consequently, it was felt that an expansion of the work in the form of further experiments would simply be a duplication and little in the way of useful new information would be secured. On the other hand, if the knowledge already gained could be applied by means of planting what may be described as demonstration plots with the most suitable pasture mixtures, such plots would provide an illustration which other landholders in the district would follow, and thus lead to a general improvement in the pasture available. Accordingly applications were invited from men who proposed planting a pasture field in the following season. This field should not be too large but of such area as to allow for practical treatment under ordinary farm conditions, and, therefore, provide results which would be quite acceptable to the average landholder working under similar conditions. From the applications received plots were chosen and seed of varieties considered most suited to the soil and climatic conditions provided for planting. This scheme for the betterment of pastures has only recently been commenced, the

great majority of demonstration plots being planted in the present season; but it is felt that with publicity the fields established will be regularly inspected and serve as a guide for future planting in the various localities. Particulars concerning these fields are set out below:—

Demonstrator.	Area.	Approx. Rainfall.	Soil.	Seed Per Acre.	Manure Per Acre.
	Acres.	Inches.		lbs.	
			Southern District.		
F. E. Woodroffe, Delamere	5	23	Light loam ...	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	2cwts. super.
F. K. Slattery, Wattle Flat	10	26	Grey sand	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	2cwts. super.
C. H. Fisher, Hope Forest	7	30	White sand....	8 Per. rye 4 Wim. rye 8 Sub. clover	2cwts. super.
S. A. Hall, Willunga	6	26	Grey sand	8 Wim. rye 4 Early Sub. clover	2cwts. super.
S. A. Hall, Willunga	5	26	Red loam	8 Per. rye 5 Sub. clover	2cwts. super.
A. T. Jefferis, Dingabledinga	7½	30	Grey loam to Red Ironstone	8 Per. rye 4 Wim. rye 4 White clover 3 Sub. clover	1 bag super.
R. C. West, Myponga	6	30	Grey silt	5 Per. rye 5 White clover 4 Sub. clover 1 *Phalaris*	1 bag super.
H. Perkins, Dingabledinga	3½	30	Grey silt to dark loam	9 plots grass and clover	
B. Kronmark, Myponga	10	30	Grey sand	8 Per. rye 4 Wim. rye 8 Sub. clover	2cwts. super.
			Adelaide Hills.		
J. Brook, Meadows	4	36	Grey sand to loam	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	2cwts. super.
J. R. Harvie, Clarendon	10	33	White sand....	7 Wim. rye 7 Sub. clover	2cwts. super.
J. C. Blakeley, Cherry Gardens	10	33	Loam.........	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	2cwts. super.
E. W. Pfennig, Bradbury	5	36	Poor, gravelly .	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	2cwts. super.
C. H. Stamp, Flaxley	5	32	Grey silt	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	1 bag super.
A. R. Lock, Blackwood	3	30	Loam.........	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	1 bag super.
A. B. Barker, Mount Barker	10	32	Grey loam	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	1 bag super.

Adelaide Hills—continued.

Demonstrator.	Area.	Approx. Rainfall.	Soil.	Seed Per Acre.	Manure Per Acre.
	Acres.	Inches.		lbs.	
T. M. Smee, Charleston	8	32	Grey loam, carrying Sub. clover	12 Per rye 2 *Phalaris*	1 bag super.
R. J. Laing, Gumeracha	2	33	Black flat	12 Per. rye 6 Cocksfoot 6 White clover	2 cwts.super.
R. Ennis, Echunga	6	34	Grey silt	12 Per rye. 5 White clover 2 Sub. clover	1 bag super.
C. M. Watson, Mount Pleasant	5	27	Grey sand	7 Wim. rye 7 Sub. clover	2cwts. super.
H. Walsh, Mount Barker	6	32	Black flat (irrigated)	15 Per rye. 5 White clover	2cwts. super.
H. W. Parks, Forest Range	5	39	Grey silt	10 Per. rye 7 Sub. clover 2 *Phalaris*	1 bag super.
			Northern District.		
J. Fisher, Gladstone	4	16	Red loam	6 Wim. rye 4 Early Sub. clover	1cwt. super.
E. H. Mattner, Clare	10	25	Red loam	5 Per. rye 4 Wim. rye 3 Sub. clover 3 Early Sub. clover 1 *Phalaris*	1 bag super.
J. J. Burrows, Riverton	10	21	Red loam	6 Wim. rye 4 Early Sub. clover	1 cwt.super.
J. Alcock, Sevenhills	10	26	Grey loam	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	1 bag super.
W. G. Kirk, Kapunda	10	20	Brown loam ..	6 Per. rye 4 Early Sub. clover	1 bag super.
F. J. G. Collins, Truro	10	20	Brown loam ..	6 Per. rye 4 Early Sub. clover	1 bag super.
W. P. Eckermann Eudunda	5	17	Brown loam ..	6 Per. rye 4 Early Sub. clover	1cwt. super.
W. S. McAuliffe, Hampden	5	17	Brown loam ..	6 Per. rye 4 Early Sub. clover	1cwt. super.
T. R. Giles, One Tree Hill	10	25	Grey loam	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	1 bag super.
W. Lloyd, Smithfield	10	18	Red loam	6 Wim. rye 4 Early Sub. clover 1 *Phalaris*	1 bag super.
J. B. Snell, Bolivar	10	17	Red sandy loam	6 Wim. rye 4 Early Sub. clover	1 bag super.
			Eyre's Peninsula.		
H. J. Salmon, Nunjikompita	10	11	Mallee	6 Wim. rye 4 Early Sub. clover	1cwt. super.
C. B. Pope, Pearlah	10	19	Sandy ironstone	5 Per rye. 5 Wim. rye 4 Early Sub. clover	1 bag super.
G. and A. Laurie, Ungarra	10	17	Brown loam ..	6 Wim. rye 4 Early Sub. clover 4 Lucerne	1cwt. super.
A. Leech, Warunda	10	18	Ironstone	5 Per. rye 4 Early Sub. clover 5 Wim. rye	1 bag super.
H. F. West, Cowell	10	11	Mallee	6 Wim. rye 4 Early Sub. clover 4 Lucerne	1cwt. super.

Demonstrator.	Area.	Approx. Rainfall.	Soil.	Seed Per Acre.	Manure Per Acre.
	Acres.	Inches.		lbs.	
			Murray Mallee.		
A. E. Stock, Moorlands	10	14	Mallee	6 Wim. rye 4 Early Sub. clover	1cwt. super.
M. S. Davis, Pinnaroo	10	15	Mallee	6 Wim. rye 3 Early Sub. clover 3 Lucerne	1 cwt.super.
			Murray Swamp.		
E. Wise, Jervois.	4	Irrigated.	Reclaimed Swamp	14 Per. Rye 8 Cocksfoot 8 White clover	2cwts. super.
J. H. Goyder, Long Flat	6	Irrigated.	Reclaimed Swamp	5 plots mixed grass and clover	2cwts. super.
			Lakes District.		
J. A. Carruthers, Narrung	10	16	Sandy	4 Wim. rye 4 Early Sub. clover 4 Lucerne Oaten cover crop	1cwt. super.
			South-East.		
F. Button, Yahl . Yahl	10	31	Volcanic	10 Per. rye 6 White clover 2 *Phalaris*	1 bag super.
I. Sims, Glencoe East	10	30	Red Volcanic sand	8 Per rye. 4 white clover 4 Sub. clover 2 *Phalaris*	1 bag super.
W. Penny, Comaum	10	26	Red sand	8 Per. rye 4 Wim. rye 7 Sub. clover 1 *Phalaris*	1 bag super.
W. K. Chambers, Mil Lel	7	31	Red sand	8 Per. rye 4 White clover 4 Sub. clover	1 bag super.
A. C. Kemp, Hatherleigh	7	30	Black sea mud.	10 Per. rye 4 Strawberry clover	1 bag super.
F. Hinze, Penola	10	26	Grey silt	10 Per. rye 7 Sub. clover 1 *Phalaris*	1 bag super.

PASTURE IMPROVEMENTS COMPETITIONS.

The competitions inaugurated by the Committee have created considerable interest amongst all concerned, and the pasture mixtures or the methods adopted by the successful exhibitors in the handling of the crop or the conservation of the fodder have been closely examined by a large number of pasture men. In addition, a healthy rivalry has been created amongst the exhibitors themselves, and, consequently, such competitions are in the interest of the movement towards pasture improvement.

The competitions conducted include sown pasture, meadow hay, and ensilage competitions, and for this purpose the State is divided into districts with separate prizes for each. In the majority of cases arrangements have been made with the Department of Agriculture for the District Agricultural Instructor to judge the competition.

When making his award the judge reports on each entry, and consequently those reports and criticisms have considerable educational value. The results obtained and the remarks made have all been published from time to time, and therefore there is no necessity to repeat the particulars, but information regarding the scale of points under which the competitions are judged may be of interest.

Pasture Competitions.—Density of Sward, 30; Quality of Pasture, 25; Freedom from Useless Weeds, 20; General Management, 15; Area submitted, 10; total points, 100.

Meadow Hay Competition.—Suitability of Plants, 25; Curing, 25; Stage of Cutting, 15; Apparent Nutritive Value, 25; Storing, 10; total points, 100.

Ensilage Competition.—Suitability of Plants, 15; Succulency, 20; Palatability, 15; Nutritive Value, 35; Percentage of Waste, 15; total points, 100.

In connection with the nutritive value of the ensilage submitted, a sample from each entry was analysed and its actual feeding value determined.

ACKNOWLEDGMENT.

The success of any work of this nature is almost entirely dependent upon the efficiency and enthusiasm of the men conducting the various trials, and opportunity is taken of expressing the thanks of all concerned for the manner in which the different experimenters have co-operated in these tests.

It is also pleasing to record the assistance rendered and the interest shown by the Adelaide Chemical and Fertiliser Co., Limited, Wallaroo and Mount Lyell Fertilisers Limited, and Cresco Fertilisers Limited. These firms have made annual contributions towards the fertiliser required and their representatives have attended the inspection of the various plots.

QUALITY OF SOUTH AUSTRALIAN WHEATS.

[By C. E. Chapman, F.I.C., F.A.C.I., Deputy Government Analyst; and A. J. Farquhar, A.A.C.I., Chemologist, Department of Chemistry.]

[In recent issues of this Journal, the subject of "Baking Qualities of Australian Wheats" was discussed from the point of view of the wheat breeder. In this article Messrs. Chapman and Farquhar give the actual baking tests of various samples of South Australian wheats exhibited at the Royal Show, and have compared the results with the Pelshenke Test (or "Wholemeal Fermentation Dough Test," as they prefer to describe it) used by the wheat breeder.]

The quality of wheat is a subject of great importance to the milling and baking trades and one which, at present, is receiving a great deal of scientific attention in most of the wheatgrowing countries of the world. It is well known that some wheats yield flours that are admirably suited for making high quality bread whilst others are quite unsuitable for this purpose. The miller aims at producing a flour which will make a marketable loaf in any baker's hands; a flour of such high quality that, irrespective of the relative expertness of the baker, is able to produce a good quality loaf. It is what is known as a "fool-proof" flour. This means that the flour will stand up to fairly wide differences in treatment in the bread making process. It will make a good quality loaf if made with a slack dough or a stiff dough. It will stand a long proofing time without the dough collapsing or it will make a satisfactory bread with a shorter proofing period. Liberties may also be taken with a good quality flour in the knocking back process and moulding of the dough without seriously affecting the loaf. If our f.a.q. wheat would yield such a flour, the troubles of our millers and bakers would be ended, but unfortunately, this is not the case, as f.a.q. wheat as now supplied to the miller to make into flour does not nearly approach the standard indicated.

OBJECT OF THIS ARTICLE.

The object of this article is to show whether the quality of flour for baking purposes as assessed by the baking test agrees with the result arrived at by the wholemeal fermentation dough test on the same wheat.

As baking tests have been made on flours milled from 44 Competition Wheats exhibited at the Royal Agricultural Society's Show, and wholemeal fermentation dough tests have been done on the same wheats, a valuable opportunity is thus afforded to make a comparative and comprehensive survey of the results obtained by these two methods.

As the samples dealt with came from the Northern, Southern, Eastern, and Western parts of the State, they represent all the wheat growing areas, and, as they were entered in competition for prizes at the Show, one may assume that they represent the best wheat grown in the State.

The knowledge derived from the tests carried out on the samples should, therefore, be of value to anyone interested in South Australian wheats and the flours milled from those wheats.

WHOLEMEAL FERMENTATION DOUGH TEST.

A test for judging the quality of wheat which has come into use during the last few years is the wholemeal fermentation dough test. Pelshenke of Germany, and Cutler and Worzella of America introduced this test at about the same time in 1930-31. The tests as described by these writers are very similar in their application, the main difference being in the fineness of grinding the grain. Pelshenke, in his paper, "Contributions Towards Determining the Suitability for Baking of Wheat and Wheat Flours" (Arch. Pflanzenbau, 1930-31, 5, 108-51), describes the method of grinding as follows:—

"In the rough grinding of the wheat, the risk of "grinding to death" on trituration mills is extraordinarily great. For this reason disc mills are out of the question for the grinding of the wholemeal, as they cause too much heat owing to the enormous number of revolutions. It is, moreover, of great importance not to attack the grain with too much force and to obtain a wholemeal of as uniform degree of fineness as possible.

"The rough grinding of the grain is, therefore, done on a trituration mill driven by electricity on which the corn is ground between a frustrum of a cone fluted on the side, which is turned by a vertical axle and a fixed grinding mantle which is also fluted. The mill makes 80.5 revolutions a minute and the firmness of the wholemeal is regulated by the movable axle

"The grain is first rough ground coarsely, the mill being set wide. As the work of disintegration done by a mill is among other things dependent on the quantity of the grist poured on, the grain is poured on continuously from a kind of shuttle. The wholemeal obtained is then ground fine twice with closer fixing, first with fixing for medium fine grinding and finally with the closest fixing. In the last two grindings the grist can all be poured on at once. It is essential that the wholemeal passes the mill without stopping it up. This can be obtained by a suitable scheme of grinding. According to the experience of the milling trade, the degree of fineness of the wholemeal and in particular of the outer parts becomes greater as the proportion of moisture contents increases. One must, therefore, be careful that the samples contain approximately equal amounts of water."

The trituration mill is similar to that described in the Fisher Scientific Company's Catalogue—8-445.

Cutler and Worzella do not work on such a finely ground meal. They grind in a Wiley mill to pass a 1 millimetre sieve having circular holes. This mill yields a much coarser meal than that given by the Pelshenke grinding process. As the Wiley mill is not procurable in Australia, an ordinary coffee mill is used in its stead.

The wholemeal fermentation test will not be described here, as it has been fully dealt with in the June number of this *Journal* (A. R. Hickinbotham, B.Sc., &c., Chemist, Agricultural College, Roseworthy, page 1450).

An interesting comparison of the results given by Pelshenke and Cutler and Worzella tests on the same wheats is shown in the table on next page. Almost without exception the Pelshenke test gives a much higher test number.

TEST FIGURES.

No.	Variety.	Pelshenke Test. Ground in Trituration Mill.	Cutler and Worzella Test. Ground in Coffee Mill.
1	Quality	294	196
4	Quality	244	150
8	Quality	186	115
9	Florence	270	191
3	Comeback	352	231
7	Pusa No. 4	320	274
12	Bena	39	35
11	Nabawa	61	44
13	Nabawa	134	88
14	Nabawa	73	59
15	Nabawa	46	46
16	Nabawa	286	138
17	Nabawa	47	31
18	Nabawa	55	38
21	Nabawa	55	40
22	Nabawa	70	64
23	Nabawa	69	60
24	Nabawa	51	42
26	Nabawa	63	54
25	Gurka	36	34
27	Ford	168	129
34	Ranee	35	24

The coarser grinding has the advantage of giving a much shorter time test, and as coffee mill grinding has been adopted by other chemists in Australia we have adopted this method of grinding in order that a comparison of the figures obtained in this department may be more conveniently compared with those of other observers. Where time tests are given in this paper without being specified, they refer to the Cutler and Worzella method and not that of Pelshenke. In Australia it would be, in our opinion, as well for chemists to drop the term "Pelshenke Test" and agree to call it "The Wholemeal Fermentation Dough Test."

EFFECT OF VARYING THE AMOUNTS OF WATER IN THE DOUGH.

The effect of varying the amount of water in the dough ball was tried on a sample of Gurka wheat with the following results:—

Water added.	Time test.	Water added.	Time test.
2.7 ml.	30 31	3.0 ml.	33 33
2.85 ml.	31 33	3.5 ml.	34 34

By increasing the amount of water to mix the wholemeal into a dough, the time test on this sample of wheat gave a higher result, but the difference is by no means very great, as it is within the limit of error allowed by the test, *viz.,* 10 per cent.

TEST AFFECTED BY MOISTURE CONTENT OF WHEAT.

Greater differences in the results were obtained by increasing the amount of moisture in the wheat prior to grinding as shown by tests made of the following wheats grown in 1933-34 season:—

Variety.	Moisture. Per cent.	Test Figure.	Moisture. Per cent.	Test Figure.
Minister	9.4	93	13.4	103
Quality (bleached)	9.4	33	12.5	44
Quality	10.0	47	13.7	55
Florence	9.8	46	13.3	50
Baringa	9.9	32	13.2	38
Standard milling blend	10.6	45	13.7	50
F.A.Q.. 1933-34 (S.A.)	9.9	26	15.0	33

The age of the wheat also appears to have some influence on the time test, the older the wheat the longer the time of the test.

MILLING THE WHEAT.

The moisture in the wheats when received in the laboratory varied from 12.0 to 14.2 per cent., and before proceeding with the milling, they were all conditioned to 14.0 per cent. of moisture except the one having 14.2 per cent., which was milled without any adjustment of the moisture being made. A Simon's experimental milling plant was used to mill the samples, 2,000 grams (4.4lbs.) of wheat being taken for the test.

In the milling process, in order to obtain quantitative results, it is necessary to take out the sieves when the semolina has all been ground into flour, as there always remains a residue on the silks which has to be carefully removed and the final separation of the pollard and flour from this residue is made by means of hand sieving. The material remaining on a No. 10 silk is regarded as pollard and that which passes through the silk as flour. The point at which to leave off the hand sieving is controlled by making a number of trials of the colour of the flour passing through the silk. When the flour begins to show signs of being discoloured by particles of pollard, the sieving is stopped and the material remaining on the sieve is weighed as pollard, and that passing through the No. 10 silk is weighed as flour.

THE BAKING TEST.

It is generally agreed that, for bread making purposes, the best method of judging the quality of flour is by means of a baking test. This test is carried out under rigidly standard conditions so that each flour is treated in exactly the same way. We have adopted the tentative method of the American Official Agricultural Chemists with one slight variation. Instead of adding 58 per cent. of water to every flour, we add the amount of water which the flour will absorb, as previously determined by the water absorption test.

Ingredients.—

Flour: Weight equivalent of 85g. of dry flour, or 100g. of flour on a 15 per cent. moisture basis.

Yeast: 3g.

Sugar (sucrose): 2.5g.

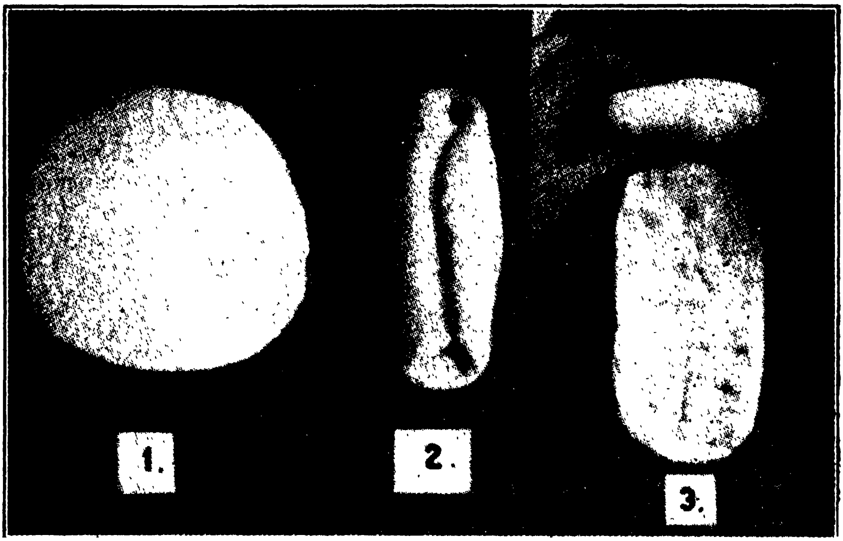
Water (distilled): Sufficient to make the water absorption of the flour as previously determined by the water absorption test on a flour of 15 per cent. moisture basis.

Mixing.—Dissolve the salt and sugar in a portion of the water. Disintegrate the weighed portion of the yeast in the salt-sugar solution or in another portion of the water. If the former procedure is followed, do not allow the yeast to remain in the salt-sugar solution for any considerable time before adding the flour. If stock solutions are used, correct for the water added. Add the flour, and mix with a flexible spatula that will conform readily to the shape of the bowl, making 125 cuts with the spatula. So regulate the temperature of the ingredients that the dough comes from the mixing operations at 30° C. Remove the dough from the bowl and fold 20 times in the hands.

Fermentation.—Place the dough in a fermentation bowl and allow to ferment for 105 minutes at 30° C. (plus or minus 0.5°) and not less than 75 per cent. relative humidity. Remove the dough from the bowl, fold 15 times in the hands (first punch), return the dough to the bowl, and allow fermentation to proceed as before for 50 minutes. Again remove the dough, fold 10 times (second punch) and place in the fermentation

bowl for 25 minutes. Remove the dough from the bowl, mould, and pan as follows:—

Moulding and Panning.—Place the dough on a table or moulding board and pound vigorously with the heel of the hand until the dough is flat and circular (Fig. 1). Holding one side of the dough, cut the mass loose from the table with the spatula, and turn on the reverse side. Fold over two opposite sides so that they overlap to a considerable degree (Fig. 2). Turn the dough over, and again pound it flat with the heel of the hand. Holding one end, cut the dough loose from the table with a spatula and turn on the reverse side with the seam of the dough running from the



Preparing the Dough for Panning.
(From Methods of Analysis A.O.A.C., U.S.A.)

operator. Starting at the more remote end, roll the dough toward the operator, folding it as tightly as possible (Fig. 3). Seal the seam tightly, and, with the seam underneath, seal the ends by pinching them vertically. Roll lightly under the palm of the hand, adjusting the dough to the length of the pan, and place in the pan with the seam down. (The length of the dough prior to the final light rolling should not exceed that of the pan). Use no dusting flour in the moulding process.

Proof.—Proof 55 minutes under the same conditions as for fermentation.

Baking.—Bake 25 minutes at a temperature of 230° C. (plus or minus 5°) at the level of the top of the baking pan. (Precise control of temperature, both as to degree and uniformity, is essential).

Measurement.—Weigh the loaf and measure its volume 30 minutes after removal from the oven.

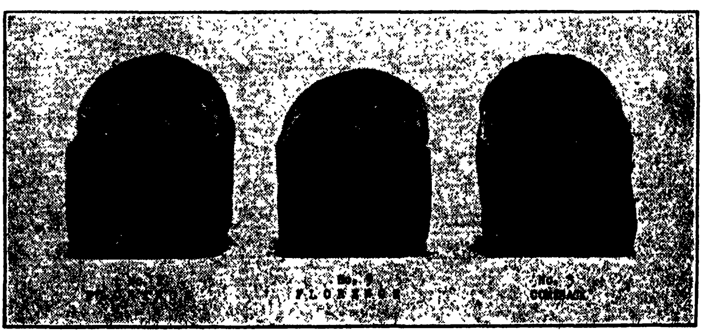
Photograph.—The loaves are placed in air-tight lever top tins overnight. The next morning they are cut, and marks awarded for general appearance, colour of crumb, flavour, texture, and pile, giving 10 marks for each, making a total of 50 points. After a little experience, a trained observer is able to assess the relative values of different flours.

PHOTOGRAPHS AND TABLE OF RESULTS.

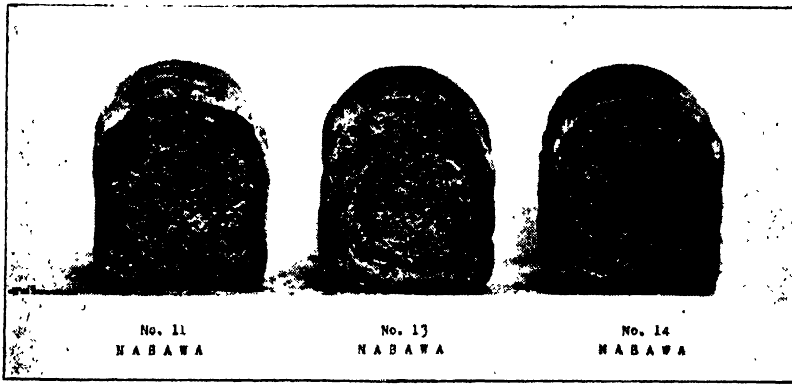
The photographs of the loaves of bread were all taken at the same distance from the camera, the magnification being the same for all samples, thus enabling an estimate of the volumes of the loaves to be made by the reader. The loaves were cut to show the texture of the crumb.

The flours from the various samples of wheat are grouped together in their varieties so that a comparison of the results on the samples of the same variety of wheat may more easily be made. Directly under the photographs, particulars are given of the results of the wholemeal fermentation dough tests, baking tests, and other data of interest in connection with the samples.

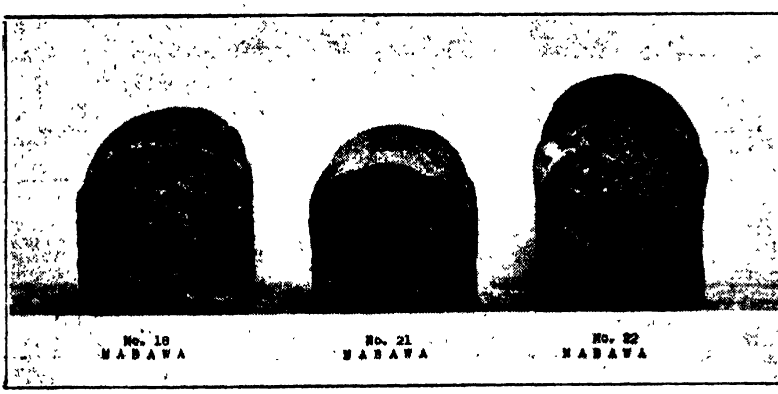
No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein, (N x 5·7). %	Flour. Water Absorption. %	District in which Wheat Grown.
1	Quality	196	42	325	139·7	10·4	12·0	65·5	West
4	Quality	150	35	290	141·1	7·8	8·8	68·0	North
6	Quality	159	35	270	140·7	8·0	8·5	68·2	East
8	Quality	115	29	280	141·3	7·0	7·7	68·2	West

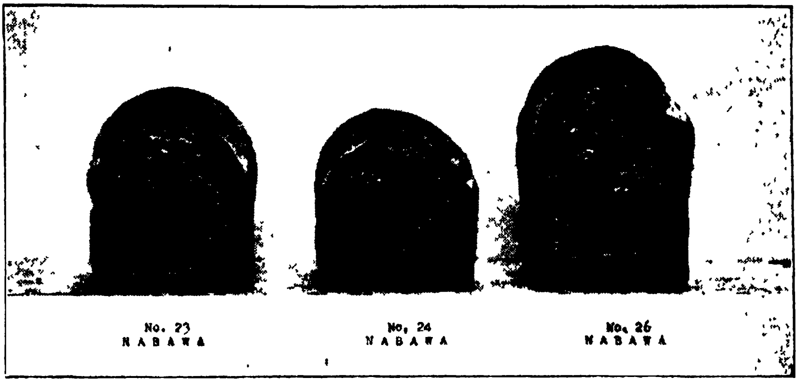


No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein, (N x 5·7). %	Flour, Water Absorption. %	District in which Wheat Grown.
2	Florence	181	39	320	138·1	8·5	11·0	64·8	North
9	Florence	191	34	290	140·8	8·4	9·6	67·0	North
3	Comeback ...	231	37	330	139·1	7·2	8·8	67·8	North

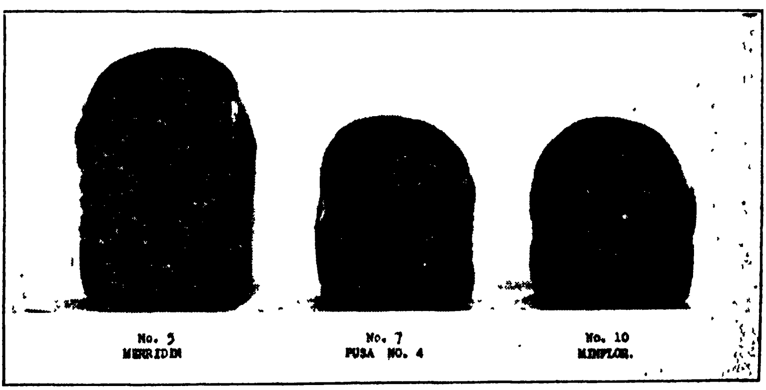

No. 11
NABAWA
No. 13
NABAWA
No. 14
NABAWA


No. 15
NABAWA
No. 16
NABAWA
No. 17
NABAWA

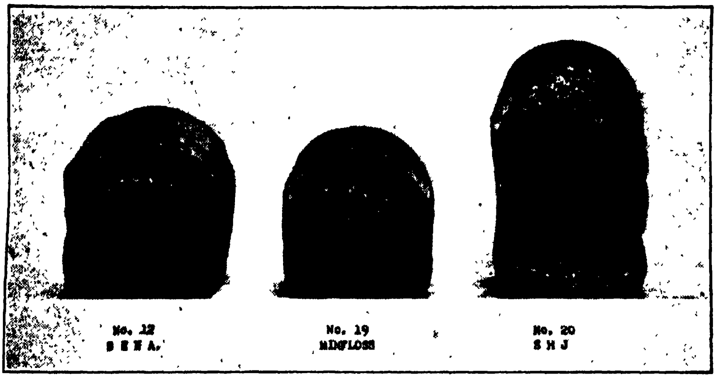

No. 18
NABAWA
No. 21
NABAWA
No. 22
NABAWA



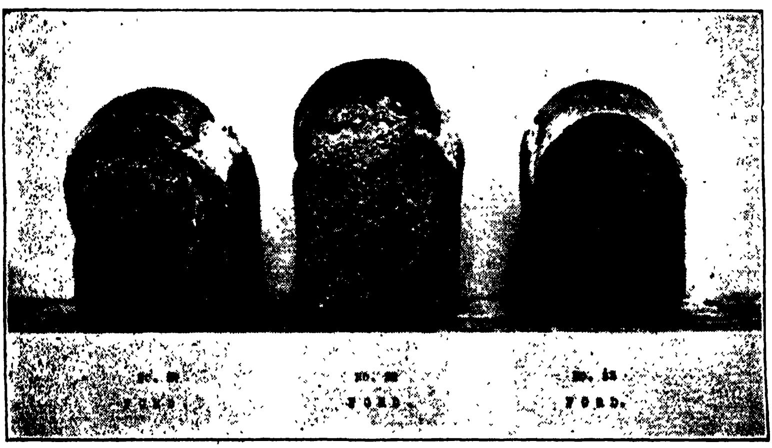
No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein, (N x 5·7). %	Water Absorption. %	Districh in whic Wheat Grown.
11	Nabawa	44	31	340	135·3	7·0	7·4	60·2	North
13	Nabawa	88	36	325	136·3	7·6	8·2	59·7	North
14	Nabawa	59	36	335	136·9	7·6	7·9	60·7	North
15	Nabawa	46	36	320	135·2	6·9	7·9	59·5	North
16	Nabawa	138	39	345	134·0	9·2	10·8	59·2	North
17	Nabawa	31	35	290	136·1	6·6	7·1	59·5	West
18	Nabawa	38	33	300	133·2	6·5	7·2	57·2	North
21	Nabawa	40	31	280	132·7	3·7	6·1	57·2	East
22	Nabawa	64	40	360	133·4	8·3	9·0	58·0	West
23	Nabawa	60	34	305	133·6	7·5	8·3	59·2	South
24	Nabawa	42	33	265	135·1	6·3	7·4	59·7	North
26	Nabawa	54	35	400	130·3	7·1	7·3	57·5	East



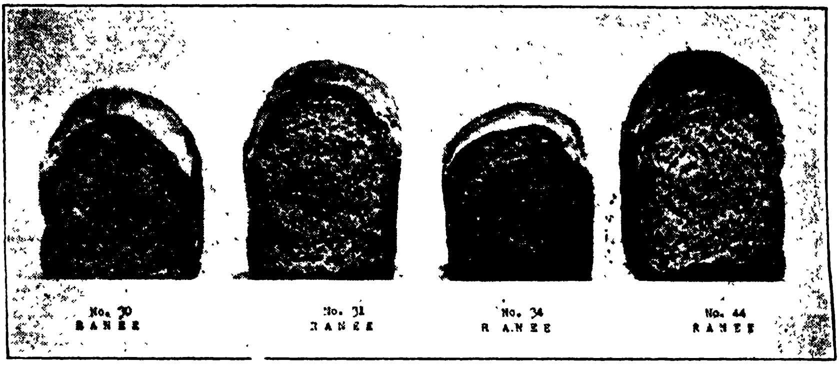
No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein, (N x 5·7). %	Water Absorption. %	District in which Wheat Grown.
5	Merridin	161	44	440	139·1	9·7	10·0	68·0	East
7	Pusa No. 4 ..	274	36	300	143·3	8·1	8·4	70·5	East
10	Minflor	111	33	310	141·3	6·4	8·5	68·2	North



No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein. (N x 5·7). %	Water Absorption. %	District in which Wheat Grown.
12	Bena	35	33	290	136·1	6·2	7·5	59·2	West
19	M nfloss......	250	36	260	143·3	8·4	9·1	69·2	North
20	S.H.J.	111	44	.420	129·7	10·8	11·0	55·2	East



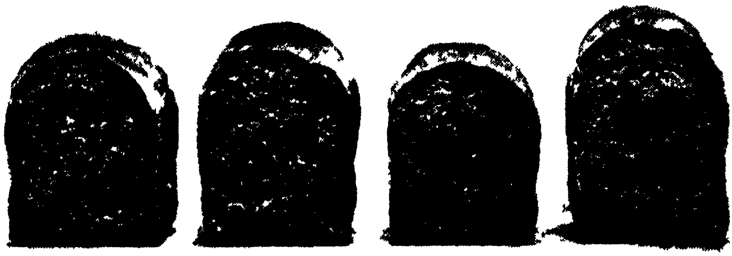
No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein. (N x 5·7). %	Water Absorption. %	District in which Wheat Grown.
27	Ford	129	37	370	134·1	7·0	7·6	59·5	West
29	Ford	186	43	425	130·4	8·3	8·6	58·0	West
32	Ford	338	38	350	136·8	7·6	8·3	60·7	North



No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein. (N x 5·7). %	Water Absorption. %	District in which Wheat Grown.
30	Ranee	67	29	310	132·9	6·7	7·2	58·7	North
31	Ranee	50	30	385	132·5	6·8	7·5	60·0	North
34	Ranee	24	23	300	134·9	3·3	5·8	61·2	East
44	Ranee	52	30	390	130·9	6·4	7·7	58·5	West

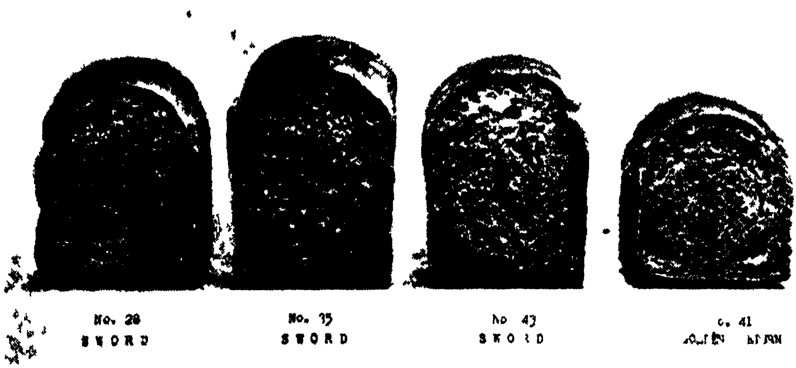
No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. ml.	Weight of Loaf. Grams.	Flour Dry Gluten. %	Flour Protein, (N x 5·7). %	Water Absorption. %	District in which Wheat Grown.
37	Currawa	50	39	325	134·7	7·3	8·6	59·0	South
40	Currawa	37	35	330	134·8	4·9	5·8	59·3	East
42	Currawa	42	38	415	133·0	7·1	7·9	59·3	East

D



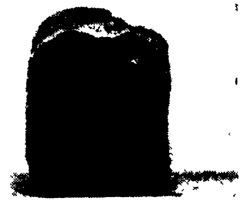
No 33 WARATAH — No. 36 WARATAH — No 38 NUGGETT — No. 39 JOFFRE

No	Variety	Whole Meal Fermentation Dough Test Number Moisture 14%	Baking Score	Volume of Loaf ml	Weight of Loaf Grams	Flour Dry Gluten %	Flour Protein (N x 5 7) %	Water Absorption %	District in which Wheat Grown
38	Waratah	31	30	340	132 [illegible]	[illegible] 7	6 2	59 2	North
36	Waratah	52	28	365	133 0	9 4	11 4	58 8	West
38	Nuggett	34	28	320	136 2	5 3	6 5	59 8	South
39	Joffre	44	36	390	133 1	5 1	5 9	59 0	North



No. 28 SWORD — No. 35 SWORD — No 43 SWORD — No. 41 GOLDEN RETURN

No	Variety	Whole Meal Fermentation Dough Test Number Moisture 14%	Baking Score	Volume of Loaf ml	Weight of Loaf Grams	Flour Dry Gluten %	Flour Protein (N x 5 7) %	Water Absorption %	District in which Wheat Grown
28	Sword	52	32	370	129 9	5 9	6 8	57 2	North
35	Sword	41	22	400	132 7	5 7	6 6	59 3	East
43	Sword	48	28	365	129 3	7 5	7 8	57 0	East
41	Golden Return	26	27	280	135 9	6 2	7 1	59 5	North



No. 25.
GURKA.

No.	Variety.	Whole Meal Fermentation Dough Test Number. Moisture 14%.	Baking Score.	Volume of Loaf. m.l.	Weight of Loaf. Grams	Flour Dry Gluten. %	Flour Protein. (N x 5·7). %	Water Absorption. %	District in which Wheat Grown.
25	Gurka	34	29	320	131·5	5·0	6·5	58·0	North

Some very high results were obtained for the wholemeal fermentation dough tests, notably on samples No. 32, Ford, 338; No. 7, Pusa No. 4, 274; No. 19, Minflos, 250; and No. 3, Comeback, 231.

One would expect that if the time test is an indication of the quality of a wheat that the baking tests on these wheats would have shown to greater advantage over the other wheats having lower time tests. But this is not so, for many wheats giving much lower time tests produce much better bread. None of the flours from the four above-mentioned wheats yields a loaf that could be classed as being of high quality, for their volumes were all below 400 ml. and their baking scores were all below 40 points. A good quality flour should secure a baking score of 40 points or more. Only five of the competition wheats for the last show reached this standard; they were No. 1, Quality; No. 5, Merridin; No. 20, S.H.J.; No. 22, Nabawa; and No. 29, Ford.

The wholemeal fermentation dough test gives results which in some cases do not agree with those obtained by the baking test, for the times obtained by the dough test are not proportional to the scores obtained by the baking test. Some wheats giving a high dough test number are quite unsuitable for bread making, such instances being No. 8, Quality, and No. 9, Florence.

The outstanding wheat of those tested is undoubtedly No. 5, Merridin. This wheat was very easy to mill and yielded a high percentage of flour. It also made a satisfactory bread under varying conditions in the baking process, which is a property highly desirable in flour.

No. 20, S.H.J., is also a first class baking flour and may be classed as the equal of Merridin with respect to its baking quality.

The three samples of Ford can also be regarded as satisfactory from a baking point of view. Ford has a tendency for the crust to break away at the top, and it lost marks for this defect.

Quality; only one sample, No. 1, of this variety made a loaf of good quality. The texture of all the samples was fairly satisfactory, No. 8 being the poorest.

The loaf volumes of these flours are more or less poor; No. 1, which gave the highest test number, gave the highest baking score and the greatest loaf volume.

One of the most interesting sets of photographs and table of results is that dealing with the 12 samples of Nabawa wheat. The photographs of the loaves obtained from these samples explain the figures given for baking score without considering flavour, pile, &c. No. 26, which gave the loaf of greatest volume, is obviously of inferior texture when compared with Sample No. 22.

The dough test numbers show fairly good agreement with the results obtained for baking score, the outstanding anomaly in this series being numbers 16 and 22. One would expect No. 16, with a test number of 138 minutes and baking score of 39, to give a higher baking score than No. 22, the latter sample giving a test number of 64 minutes and a baking score of 40. Taking the results on the whole, however, those obtained for wholemeal fermentation time tests agree fairly well with those obtained for baking score, as determined by the baking test.

The volume of a loaf is by no means a true index of the quality of bread. Take the case of No. 35, Sword; this sample gave a loaf volume of 400 ml., yet it obtained the lowest baking score of all the 44 samples. Its texture had the appearance of honeycomb, and it obtained very low marks in other respects.

The samples of Bena, Sword, Waratah, Golden Return, Nuggett, and Gurka proved to be unsuitable for bread making.

The samples of Ranee were of poor quality, No. 34 being particularly bad. The latter sample had a low dough test number, was of poor baking quality, and very low in protein.

Attention is drawn to the fact that Merridin and S.H.J., the two flours that obtained the highest points in the baking test, gave results for dry gluten which were almost as high as those for protein (N x 5.7) obtained on these flours:—

	Merridin.	S.H.J.
Dry gluten	9.7	10.8
Protein	10.0	11.0
Ratio (dry gluten to protein)	0.97:1	0.98:1

In the majority of wheats tested, the ratio of dry gluten to protein was much lower than those obtained for these two wheats. This peculiarity may be only a coincidence, but it may be worth while following up this matter when other samples of wheat are tested.

SUMMARY.

1. The wholemeal fermentation dough test does not give results expressed in time (minutes) that are proportional to the quality of flour when judged by the score obtained by the baking test.

2. A very high test obtained by the wholemeal fermentation dough test does not necessarily mean that the flour obtained from the wheat will be of high baking quality.

3. The wholemeal fermentation dough test is of value to wheat experimentalists, as wheats giving a lower test than 35 minutes may be discarded, as they can be regarded as being of poor quality.

4. Although the baking test is one which is more or less affected by the personal factor, it appears to be at present the best test available for judging the quality of flour.

5. Different operators should obtain agreeing results provided the conditions of the baking test are rigidly adhered to.

6. The interpretation of the baking test, i.e., the awarding of the baking score, is more or less a matter of opinion, but different observers should agree to within 2 or 3 points.

We desire to acknowledge the assistance rendered by Lt. Col. G. D. Shaw, F.A.C.I., and Mr. A. H. Scarfe, A.A.C.I., who carried out some of the chemical analyses and baking tests in connection with this subject.

THE IMPORTANT PASTURE PLANTS OF SOUTH AUSTRALIA CONSIDERED AS TO THEIR IDENTIFICATION AND CHARACTERISTICS.

[By E. M. HUTTON, B.Ag.Sc., Field Officer.]

(*Continued from page* 1554.)

B—THE CLOVERS AND CLOVER-LIKE PLANTS.

All legumes belong to the large family *Leguminosae.* This family has three sub-families, and it is the sub-family *Papilionatae,* consisting of all pea-like plants, to which the clovers and clover-like plants belong.

The pasture legumes in the sub-family *Papilionatae* are herbaceous plants with flowers which resemble a miniature sweet pea. The seed is contained in a pod which varies from a straight one in the Bird's-foot Trefoils to a coiled one in the Medics. The number of seeds in a pod varies from one or two in the Melilots to as many as six in Lucerne. The seeds are kidney-shaped and vary in size from very

Fig. 21.—Seedling of White Clover (*Trifolium repens*) at different stages of growth. In 1 the seed leaves or cotyledons are shown; in 2 the first foliage leaf is seen to be simple; in 3 the ordinary trifoliate leaves have appeared. [From *Agricultural Botany* by John Percival.]

small in Clustered Clover to relatively large ones in Subterranean Clover. The first leaves which appear are smooth and rounded, and differ from the true leaves. (See Fig. 21.) In the majority the leaves are divided into three leaflets, each leaflet possessing its own little stalk. This trifoliate leaf is borne on a longer stalk, which always has a pair of small leaf-like processes or stipules where it joins the

main stem. (See Fig. 22.) The lengths of the three small leaflet stalks and the character of the stipules are important in identification. In the Bird's-foot Trefoils the leaf is divided into five leaflets, the two lower leaflets taking the place of the stipules which are absent. The general habit of the pasture legume—that is, whether annual or perennial—is also important in identification.

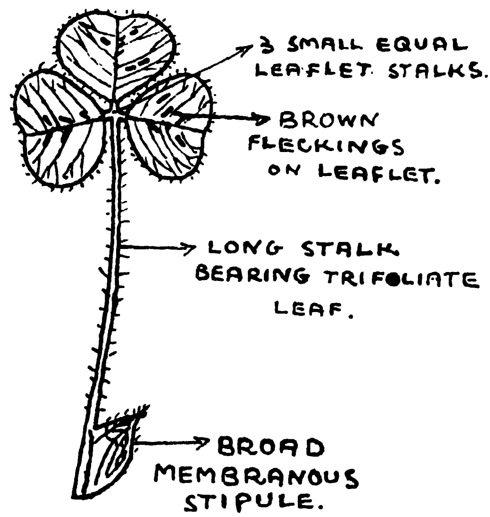


Fig. 22.—Showing Trifoliate Leaf of ordinary late Subterranean Clover (*Trifolium subterraneum*). Only one of the two stipules is shown.

Fig. 23.—Showing lumps or nodules containing *Bacillus radicicola* on the roots of Subterranean Clover.

Legumes are now recognised as necessary constituents of every pasture because they provide the soil with the cheapest form of nitrogenous fertiliser, improve the feeding value of the pasture for stock, and because their feeding value when mature is much higher than grasses at the same stage.

Legumes are the only known family of plants which are able to utilise atmospheric nitrogen. In 1886 Hellriegel and Wilfarth showed that the power of legumes to fix atmospheric nitrogen was due to microscopic organisms or bacteria in the

Fig. 24.—The Life Cycle of *Bacillus radicicola*.
[Taken from *Soil Conditions and Plant Growth* by E. John Russell.]

small lumps or nodules on their roots. (See Fig. 23.) There are various races of this bacteria which is known as *Bacillus radicicola, e.g.*, Lucerne, Subterranean Clover, Lupin, &c., each possessing a different race in their root nodules. Thus the race which forms nodules on Subterranean Clover will not form nodules on Lucerne or the Lupin.

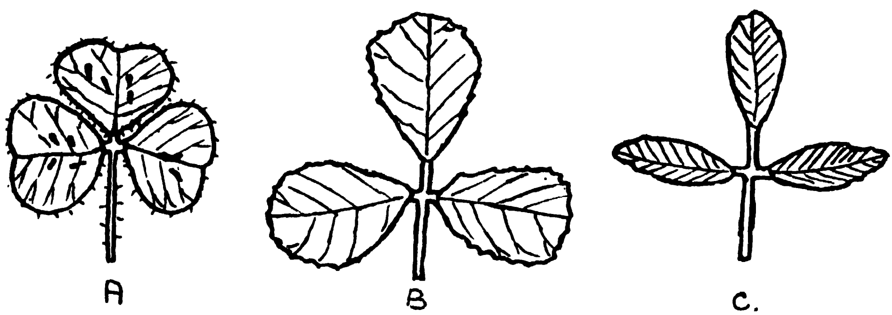


Fig. 25.—A. Showing three equal leaflet stalks, typical of true clover or trifoliums. B. Showing two equal and one longer leaflet stalk, typical of the Medics. C. Showing two equal and one longer leaflet stalk, typical of the Melilots.

The different races of bacteria occur only where their particular host legume is to be found. Without its particular race of bacteria the host legume forms no root nodules, and makes sickly, unproductive growth. At Toora, in Victoria, when lucerne was first grown there, it made very weak growth because of the absence of its race of *Bacillus radicicola*. When soil containing the bacteria was taken from the Werribee lucerne fields and spread over the Toora lucerne it made active productive growth. As the same race of the bacteria occurs in the nodules of both lucerne and the widely spread Burr Clover (Burr Medic), this trouble with lucerne is not likely to occur except perhaps where the soils are very lime-deficient, as in our higher rainfall districts.

With Subterranean Clover there is the possibility that the right race of *Bacillus radicicola* is not present, especially in the poorer sandy soils of the high

rainfall districts, where this clover has never been grown. By sowing poorly threshed seed (*i.e.*, burrs and soil particles present which contain the right race of bacteria) on virgin scrub land this trouble can be avoided.

When the host plant dies the root nodules decay in the soil and the bacteria are liberated. These are able to live for several years in the soil as non-motile cocci (shown as dots in Fig. 24) in the absence of the host legume. When the first true leaves of the young legume are formed, the bacteria move through the soil as motile cocci (black dots with tails in Fig. 24) at the rate of about one inch in twenty-four hours, and penetrate the root hairs of the plant, where they increase in numbers,

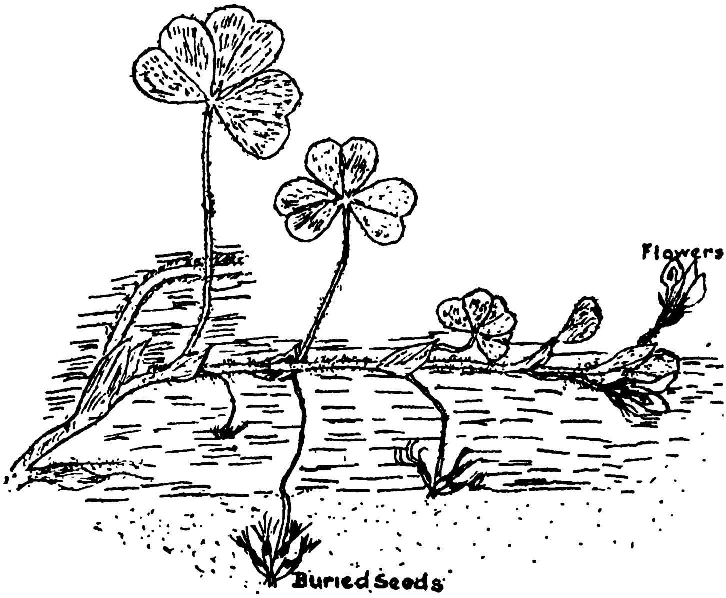


Fig. 26.—Showing the reseeding habit of Subterranean Clover *(Trifolium subterraneum)*.
[From *Some Common Clovers* by A. Morgan, B.Agr.Sc., in *Journal Agric.*, Victoria, March, 1932.]

first as motile and then as non-motile rods (Fig. 24). As a result the cells of the host plant multiply quickly in these regions with the formation of the characteristic nodules. In the nodules the bacteria occur as banded rods (Fig. 24) which break up into non-motile cocci when the nodules decay. The relationship of bacteria and plant is of mutual benefit, because the bacteria extract nitrogen from the soil air, this nitrogen being converted into soluble nitrogenous compounds, which are passed on to the plant. In return, the bacteria receive sugars and other food materials manufactured by the leaves of the plant. From the time they enter the root hair to the time when they are liberated from the decayed root nodules the bacteria pass through a definite life cycle (see Fig. 24).

As Subterranean Clover contains on an average 3½ per cent. nitrogen, 1 ton of dry matter per acre produced during the season would contain nearly 80lbs. of nitrogen. Stock grazing on Subterranean Clover will return at least half of this nitrogen (*i.e.*, 40lbs.) back to the soil. This is equivalent to applying a dressing of over 1½cwts. of sulphate of ammonia to the soil. As about 14 per cent. of the nitrogen of the plant is located in the nodules and roots, the soil is further enriched with nitrogen when these decay.

Thus a pasture legume enriches the soil in nitrogen appreciably, this nitrogen becoming available to non-legumes such as grasses growing in association with or after the legume. The two outstanding plant foods with which pasture grasses and non-legumes have to be supplied are phosphorus and nitrogen. On the other hand,

pasture legumes obtain their own nitrogen, and thus need to be supplied with phosphorus only. Therefore, if legumes and grasses are grown together in a pasture, the productivity can be maintained simply by top-dressing with superphosphate, because the grass obtains its nitrogen from the clover. When a natural pasture is top-dressed with superphosphate, clovers predominate one year and build up the nitrogen of the soil, while the next year annual grasses and weeds will predominate and use up the nitrogen so built up. This occurs because clovers are depressed by a high percentage of nitrogen in the soil and because grasses thrive luxuriantly when there is plenty of nitrogen present. The ideal under these conditions is to have a highly productive perennial grass, such as *Phalaris tuberosa,* growing in association with the clover and using up the nitrogen as it is produced. This leads to what is known as a stable pasture, which can be relied on.

In a pasture, legumes help to make the pasture more nutritious for stock because they are richer in the essential minerals and nitrogen, and in addition have a much higher feeding value at maturity than grasses. The following analyses from Bulletin No. 49 of the C.S.I.R. serve to illustrate this:—

Table Showing Per Cent. Nitrogen, Lime and Phosphorus in the Dry Matter of Wimmera Rye Grass and Subterranean Clover at Various Stages of Growth.

Harvest.	Per Cent. Nitrogen.		Per Cent. Phosphorus as P_2O_5.		Per Cent. of Lime.	
	Wimmera Rye Grass.	Sub. Clover.	Wimmera Rye Grass.	Sub. Clover.	Wimmera Rye Grass.	Sub. Clover.
1st when plants young	4·97	4·74	·87	·71	·86	2·30
2nd	4·49	4·26	·58	·70	·97	2·60
3rd	3·52	3·69	·45	·50	·81	2·17
4th	2·14	2·82	·35	·42	·70	2·22
5th when plants mature	1·60	2·50	·28	·39	·76	2·31
Average per cent. for season	3·3	3·6	·5	·54	·8	2·3

Like the grass family, the sub-family *Papilionatae* of the family *Leguminosae* can be divided into a number of groups or genera.

I.—THE TRUE CLOVER GROUP, OR TRIFOLIUMS.

A true clover always has the three small stalks of the three leaflets equal in size. In this way it can be distinguished easily from a Medic or Melilot (see Fig. 25). In addition the small pea-like flowers are always clustered in a head.

1. SUBTERRANEAN CLOVER *(Trifolium subterraneum).*

As this clover has been described in detail in *Bulletin No.* 240 by *W. J. Spafford, Deputy Director of Agriculture,* the main points only need be considered. It is a hairy prostate annual with heart-shaped leaflets. The stipules are broad and membranous with short hairy points. (See previous Fig. 22.) Subterranean Clover acts like a perennial, because it buries a proportion of the seed crop each year. (See Fig. 26.) Because of this and its relatively large seed—filled with abundant food reserves—the young seedlings are able to develop quickly after germination and provide grazing earlier than other annual clovers. It can also be grazed more heavily than other annual clovers because of its seed-burying and prostate habits.

On the poorer soils of our high rainfall districts (*e.g.*, Hills and South-East) Subterranean Clover with superphosphate is the first step in pasture improvement. After about 8 to 10 years of Subterranean Clover and superphosphate the previously poor soil is converted into a dark friable loam, high in humus and nitrogen.

The appearance of a vigorous growth of annual grasses and weeds is an indication that the fertility of the soil is high enough for the introduction of perennial grasses such as *Phalaris tuberosa*. This is the second step in pasture improvement, and is necessary if a stable balanced pasture is aimed at. An almost pure Subterranean Clover pasture is undesirable, not only because it is unstable, but because it is only suitable for cattle, being unbalanced in nitrogen and mineral content (*e.g.*, it is very rich in lime, as seen by the table given).

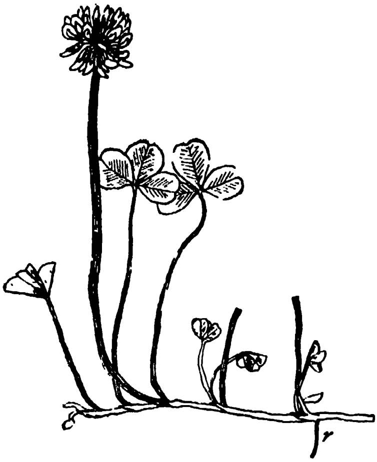


Fig. 27.—Portion of White Clover plant, showing creeping habit of stem and root "r."
[From *Agricultural Botany* by John Percival.]

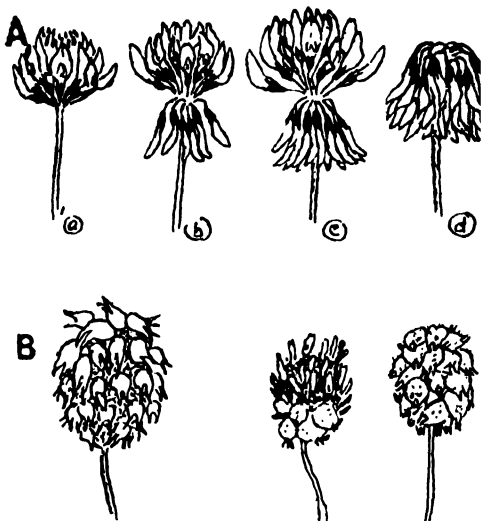


Fig. 28.—A. The various stages in the turning-down of the flowers of the White Clover flower head. B. The characteristic bladdery appearance of a mature Strawberry Clover flower head.
[From *Some Common Clovers* by A. Morgan, B.Agr.Sc., in *Journal Agric.*, Victoria, March, 1932.]

In general, ordinary late Subterranean Clover (Mount Barker strain) needs the more temperate conditions, and will not thrive where the rainfall is less than 22in. Where hot summer conditions appear early the late strains cannot set seed because they are still flowering. However, an early maturing strain (Dwalganup), discovered in Western Australia, is able to set seed where dry weather sets in early. As a result, this Dwalganup strain will be a means of extending the Subterranean Clover zone into the drier cereal belt. It is a good associate clover for Wimmera Rye Grass or *Phalaris tuberosa* in the 17-22in. rainfall belt.

The late strains always have brown fleckings on the leaflets, while the early strain usually has a cream arch on the leaflets.

2. WHITE CLOVER (*Trifolium repens*).

This is a hairless perennial clover with creeping rooting stems. (See Fig. 27.) The light green leaflets are always rounded at the tip, and white markings are often present. The stipules are membranous and transparent, adhere closely to the stem, and have an irregular torn tip. Young White Clover plants can easily be confused with those of Clustered Clover. However, in Clustered Clover the margin of leaflets are toothed, the stipules end in a sharp green point, and the colour of the stipule veins changes from green to purplish.

The flower clusters are white at first, and then become pink when withering. At this stage the flowers commence turning down, beginning at the bottom first. This definitely distinguishes the flower head of White Clover from that of Strawberry Clover, in which the flowers become bladdery and look like a strawberry. (See Fig. 28.)

The perennial habit of White Clover depends upon the new plants formed by the creeping, rooting stem, and the young plants which are continually appearing from the seed formed. Thus the old plants are continually being replaced. It is a highly palatable clover, and can only be grown where there is an abundance of soil moisture in summer, when it makes its maximum growth. Thus it is a good associate clover for Cocksfoot. It can only be grown successfully in favoured spots in the Adelaide Hills, extreme Lower South-East, and under irrigation on the Murray Swamps. The lucerne flea attacks it very readily.

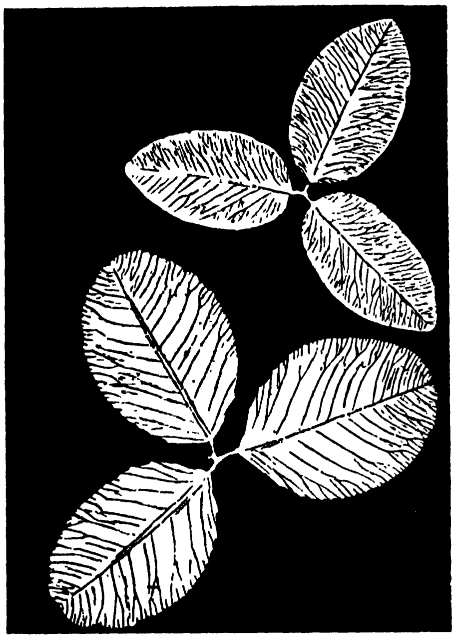


Fig. 29.—Showing the different veining and shapes of the leaves of White Clover (lower) and Strawberry Clover (upper).
[From *Some Common Clovers* by A. Morgan, B.Agr.Sc., in *Journal Agric.*, Victoria, March, 1932.]

There are six types, and of these White Dutch is the worst and New Zealand Wild White the best. Much of the so-called White Dutch sold on the market is really New Zealand White Clover (either certified Wild White or the inferior ordinary White Clover).

3. STRAWBERRY CLOVER *(Trifolium fragiferum).*

This is a perennial clover with creeping, rooting stems. It often possesses some sparse hairs on the leaf stalk. The leaflets are dark green, and often show brown markings. The leaflets are oval in shape, and come to a point at the tip. (See Fig. 29.) The stipules are fleshy with a long point, and possess greenish-purple veins. The flower head has already been mentioned.

It is particularly adapted to marshy localities and rich, swampy, low-lying country, where it makes rapid luxuriant growth. The seed is very difficult to harvest and thresh, with the result that only limited quantities are put on the market at a high price. Thus it is usual to establish Strawberry Clover by planting pieces of the root.

(*To be continued.*)

GRAFTING AS A MEANS OF CHANGING VINE VARIETIES IN A VINIFERA VINEYARD.

[*By* J. L. WILLIAMS, R.D.A., *Viticultural Instructor, Etc., Roseworthy Agricultural College.*]

The writer has from time to time received inquiries concerning the method or methods adapted to the purpose of changing over a variety of vines to a more suitable variety. In view of the apparent necessity of changing over certain red wine varieties, such as "Shiraz," "Mataro," and "Grenache," to more profitable white sorts has suggested that some information on this subject would be acceptable to South Australian vine growers.

It is not, however, suggested that growers having large areas of these red varieties should attempt to graft over the whole of their vineyards to white varieties. It is conceivable that, if this should be commonly adopted, growers would in a few seasons find themselves with an unsaleable surplus of white grapes. At the present time, however, the better white varieties are eagerly sought by the wine makers, whilst on the other hand "Shiraz," "Grenache," and "Mataro" are difficult to quit at a payable price. Further, it may be imagined, if red varieties were grafted over wholesale to white sorts, there would eventually be a shortage of red wine sorts. The most growers should attempt, therefore, is to graft over a small area of red sorts at the one time, say 1½ or 2 acres in the first year, and then only as demand indicates that a further succession of graftings is warranted. The grafting of vines is a long and tedious, but fairly simple operation, providing the grower is prepared to perform it with a sufficient amount of care.

THE EFFECT OF GRAFTING ON THE NUTRITION AND GROWTH OF THE COMPOUND PLANT.

To gain a clear conception of this aspect of grafting it is first of all necessary to consider the life of the ungrafted plant growing under average vineyard conditions.

Dr. A. I. Perold, in his excellent work, "A Treatise on Viticulture," has explained this aspect of the subject in a very lucid manner, and the writer's comments on this point are modelled on Dr. Perold's ideas. The above ground portions of the vine, *i.e.*, stem, arms, canes, and fruit are supplied with their necessary moisture and raw plant food nutrients by the root system of the vine. This root system in return is supplied with elaborated (manufactured) plant food (starch, sugar, protein, &c.) from the leaves. The growth, development, and functions of the root system are governed by the inherent vigour of the variety and by environmental factors, such as moisture, soil texture, plant foods, heat, air, and other factors. So, according to circumstances, the root system has a certain capacity for absorption of moisture and plant foods. This Perold calls the functional capacity of absorption, denoted by "Ca."

Similarly, the aerial portions of the vine have a certain capacity for the utilisation of this same moisture and plant food, turning it into elaborated sap through the agency of its leaves. This capacity for the utilisation of the materials supplied by the roots is termed its functional capacity of consumption "Cv."

An unpruned vine growing under average conditions, in early spring, naturally assumes a condition where "Ca" equals "Cv" (Ca = Cv). Later in the season, when moisture becomes limited, Cv tends to become greater than Ca, and the vine fails to develop its fruit properly, and portion of the plant perishes. The grower prunes his vines with the express object of creating a condition where Ca is greater than Cv, in order that the annual canes may grow strongly in an endeavour to bring back the balance. The size and weight of the bunch bears a close relationship to the size and vigour of the canes on which they are carried, hence by careful pruning the quality of the grape harvest may be suitably regulated.

In drought periods the vine tends to establish a condition where Ca $<$ Cv, with its attendant evils, *i.e.*, weak, brittle canes, fruit but poorly ripened, eyes poorly developed for the next season's crop.

By reasonably heavy pruning the grower gives the root system a little in reserve to tide the vine over a drought period.

In the case of the grafted vine we have a compound structure to consider, and if the functional capacities of the stock variety are represented by Ca and Cv, and those of the scion variety by Ca^1 and Cv^1 respectively, then there are three possibilities, either Ca = Cv^1 or Ca $>$ Cv^1*.
$<$

It is doubtful if there exist two different varieties whose functional capacities are equal, and this becomes more improbable when one realises that the graft union in itself restricts the movement of sap, being more apparent where certain imperfections occur in the knitting (uniting) process. There are then only two cases to be considered, either Ca $>$ Cv^1 or Ca $<$ Cv^1. In certain special circumstances the combination Ca $<$ Cv^1 is made use of, as, for example, the instance of dwarfing stocks being used for certain varieties of fruit trees, where the dwarfing has the effect of permitting early production and more regular cropping. Generally speaking, however, this is a dangerous combination for vines, and the compound plant generally suffers some debility, *i.e.*, it may die suddenly, or gradually over a period; the stock and scion may lack affinity; the vine may not set fruit satisfactorily.

The only reliable combination, therefore, is that where Ca $>$ Cv^1, *i.e.*, we should, if possible, use a scion variety of slightly less vigour than that possessed by the stock variety. Fortunately this is the case in the particular instance under consideration. The three varieties previously mentioned, viz., "Shiraz," "Mataro," and "Grenache," have vigorous root systems, and will give a satisfactory combination with nearly all white grape scion varieties.

GRAFTING AFFINITY.

The term "affinity" refers to the inherent desire on the part of one variety to unite successfully with another variety. All, or almost all, European varieties will unite satisfactorily one with the other. It does not necessarily follow, however, that the compound plant will be a success in the vineyard. The term "affinity" has and is used in a broader sense to embrace the fact of the grafted plant being a success or non-success in a commercial planting, and where the term is used elsewhere in this connection it will be taken to cover this broader application.

* Sign = denotes equals $>$ denotes greater than
$<$ " less than.

Information pertaining to the above aspect of grafting, so far as it applies to combinations of vinifera is very meagre, particularly in the case of wine varieties. The only instances of poor affinity that I can call to mind is that "Muscat Gordo" and "Carbernet" are, generally speaking, unsatisfactory as stocks, and that "Zante Currant," which is usually a good stock, will not succeed with "Shiraz" as the scion, although "Zante Currant" makes a satisfactory combination with "Shiraz" used as the stock.

However, the question of affinity is not of very great moment in the case of vinifera combinations, as most vines used as stocks will permit grafting being conducted below ground, in which case the scion eventually makes its own roots and becomes independent of the stock.

THE INFLUENCE OF EXTERNAL CONDITIONS ON THE FORMATION OF CALLUS AND THE KNITTING PROCESS.

Access to air facilitates the formation of callus, and grafting is not as successful in stiff compact soils as it is in lighter sandy soils, where the graft union is made well below the surface soil.

The temperature of the soil also considerably influences callus formation. The optimum temperature is 30 degrees centigrade (spring temperatures). Callus forms best in almost dry sandy soils (optimum moisture content 15 per cent.). This explains why excess moisture, in the form of heavy rain, very often causes some grafts to fail. For this reason, when grafting in fairly stiff soils in a wet season, it pays to leave the grafting operation until the sap rises in the vines to be treated, or even to wait until growth has started.

In the irrigated soils of the Murray valley grafting can be performed much earlier, in view of the light winter rainfall and light soils, and also for the reason that an irrigation is applied before bud burst, which would interfere with the grafting where it had been applied late.

On the stock, callus forms more readily on a longitudinal section or cleft made on the stem than it does on the traverse section, and with most systems of grafting the operation is performed in a way which takes full advantage of this phenomenon. On the stock or scion, callus forms best on the base of a sloping section, such as is made on the wedge-shaped scion in the "cleft" graft method, and as on the sections on the stock and scion in the "whip tongue" graft method. Also callus forms more readily at the nodes, and least on the internodes, consequently when shaping the scion in the "cleft" graft method the sloping sections should commence at a spot adjoining an eye, as in Fig. 1, and in the "whip tongue" graft similarly as in (*a*) Fig. 3.

METHODS OF GRAFTING.

The grower has the option or choice of two methods, viz., the "cleft" graft method, which necessitates the loss of one full crop, or the "whip tongue" graft in conjunction with layering, which takes advantage of the fact that the change over of varieties can be effected without the loss of the crop.

In this latter instance it will necessitate the use of trellising, in which case, if operating on a bush pruned stock variety, it will be necessary

to trellis the new variety. In fact, wherever grafting is contemplated it is as well to trellis the new variety, as it is very difficult to train satisfactorily grafted vines on the bush principle on account of the very rank and vigorous growth obtained from the graft. Of the two methods, "cleft" grafting is the one more usually adopted by growers, and for which reason this method will be outlined first.

CLEFT GRAFTING.

The method can be applied successfully, both on well established vines and on young vines two or three years old (in the vineyard).

In the first instance the stems of the vines to be grafted will have, according to vigour, a fairly large girth, and in the latter instance the vines will only possess stems, the diameters of which are about ½in. or little more. In each instance the operation is almost identical.

There is a decided dearth of information concerning the success, as a grafted vine, of any two varieties used in a grafting combination, but almost invariably the writer has found that "Shiraz," "Grenache," and "Mataro" will give satisfactory results where any variety of slightly less vigour is used as the scion variety. Where some doubt exists, the difficulty can in most cases be rendered relatively unimportant by effecting the graft union some 4in. to 6in. below normal soil level, whence the scion variety eventually makes its own root system, and after a few years will be quite independent of the stock.

Much, however, depends on the condition of the root system of the stock variety. In some cases, and particularly in stiff soils, the stems of the stocks branch only a few inches below the surface of the soil, in which case grafting cannot be performed other than near the surface, on account of the necessity of having a clean section of the stem for the grafting operation.

In nearly all cases, however, no difficulty will be experienced with the stock varieties previously mentioned.

THE COLLECTION AND TREATMENT OF THE SCIONS.

Medium sized cuttings are best, and these should be cut to a convenient length (say 18in.), using that portion of the canes on which internodes of an even length are to be found. Fruiting canes should be used, and these only from healthy vines of known good cropping capacity. It will be found advisable to mark such vines during the cropping season. The scions should be tied into bundles of not more than 10-15 canes.

A shallow pit should next be prepared, large enough to accommodate the required number of scions, in a light sandy soil. The bundles of scions should be placed in this pit in successive layers, each layer being covered with a few inches of sand and firmed. The last layer of cuttings should be covered with about 6in. of sand to prevent the topmost scions becoming dry. The scions, when lifted for grafting, should be moist, pliable, and show a clear, healthy green colour when cut. Scions which have been stratified in this way will section much cleaner than scions taken direct from the vine, and should grafting be delayed until after bud-burst, these scions will still be in a dormant condition.

SHAPING THE SCION.

Several methods have been advocated for shaping the scion, but the writer has found that scions shaped in the form of a single wedge and possessing two well developed eyes, as in Fig 1, is the most satisfactory, and has the added advantage of simplicity of operation. The two sections

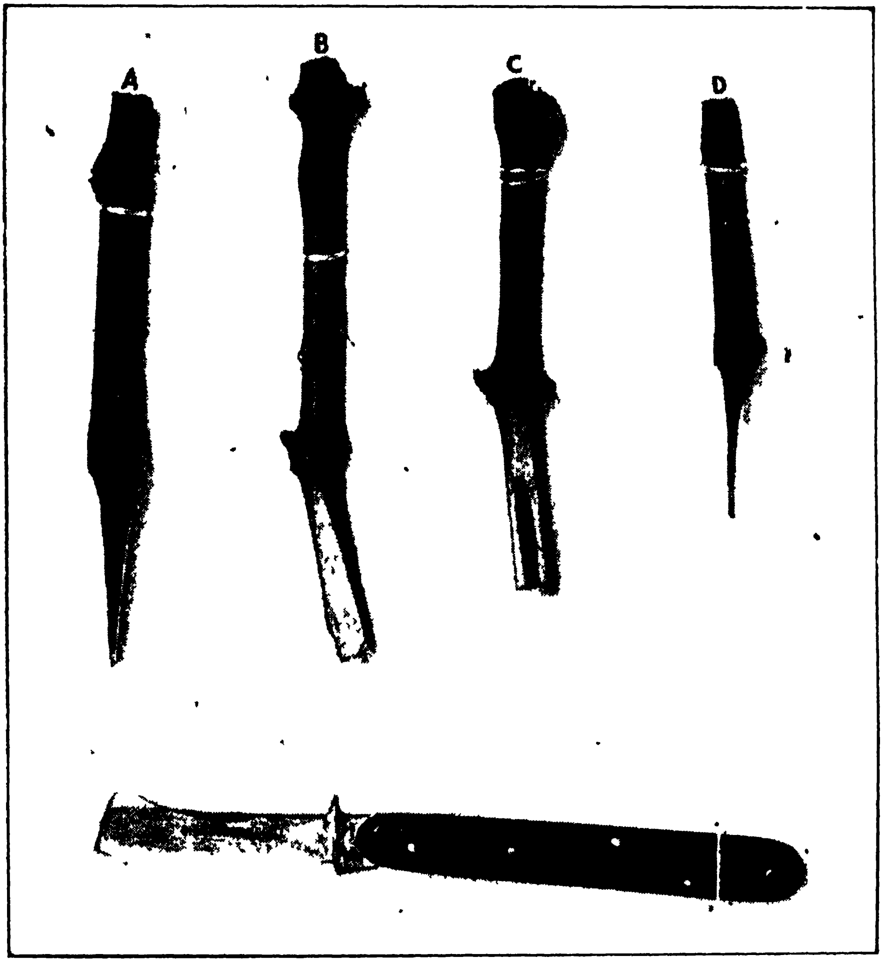


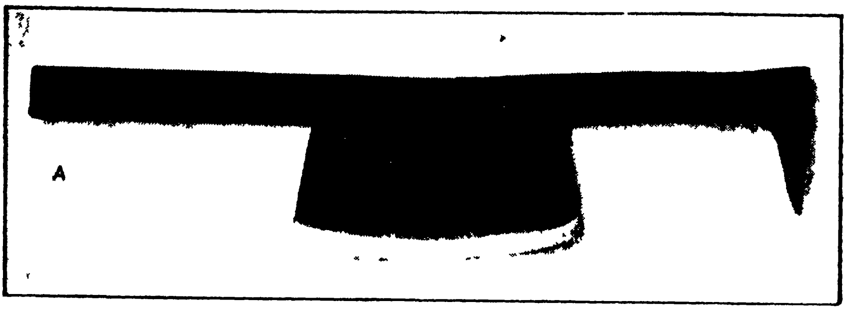
Fig 1—Scions prepared for the Cleft Graft A Showing a side view of the doub'e wedge scion prepared for the cleft graft B and C Showing a general view of the sections of the prepared scion D. Showing a modification of the usual method of preparing the scion, this method is not generally used

constituting the wedge should be commenced near the eye, to take advantage of the fact that callus forms most readily at this point. For a large stock two scions should be inserted—small vines will accommodate only one.

E

THE PREPARATION OF THE STOCK.

According to circumstances previously referred to, the operation will be performed either below ground or at ground level. In either case the operation is identical. The stem of the vine is severed with a pruning saw on a clean spot on the stem, *i.e.*, avoid making the cut on a knobby portion of the stem, where some difficulty will be experienced in securing a neat fitting of the scion.



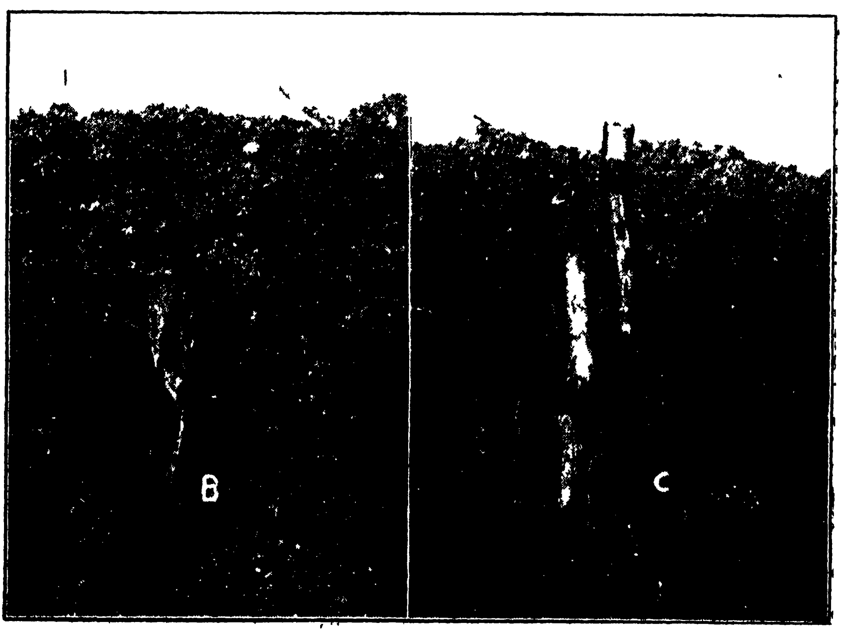


Fig. 2.—Showing method of making the Cleft Graft. A. A grafting chisel made from an old chaffcutter blade and provided with a wedge at one end. B Showing the cleft, which is held open by the aid of a small hardwood wedge. C Showing the two scions in position, with the wedge removed.

The stem is now split down with a grafting chisel (see Fig. 2), with the aid of a wooden mallet. The chisel shown in the figure can be conveniently made from an old chaffcutter blade, and is a very effective implement.

On vines with a stem of small diameter it will be necessary to tie the stock some 2in. below the cross section to prevent an unnecessarily long split, which will result in an ineffective fit.

Stout twine should be used, and should be long enough to be used in binding the stock and scion in position. A simple grafting knot should

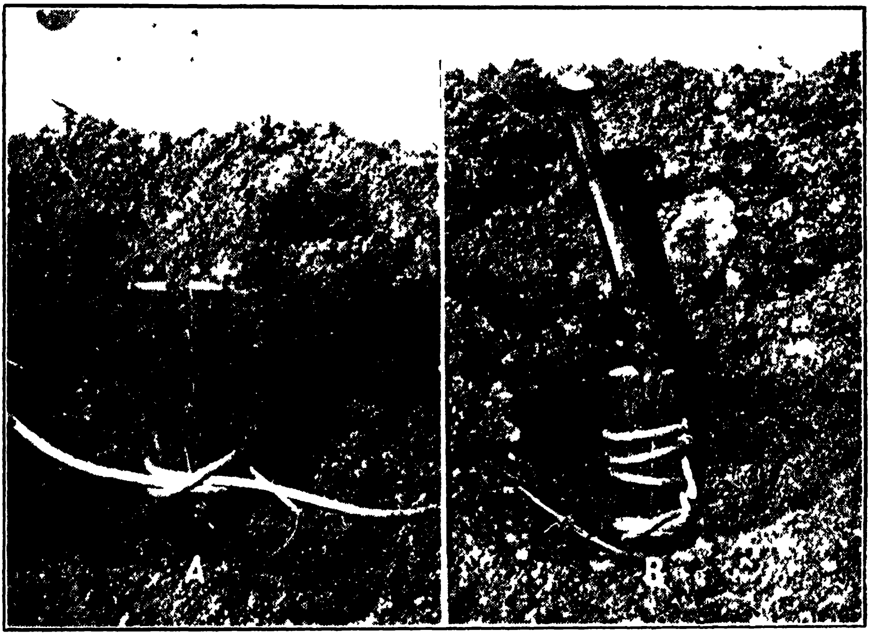


Fig 2a.—The Cleft Graft performed on a Young Vine A Showing the stock which has been prevented from splitting by means of a simple grafting knot (clove hitch) B. Showing the single scion placed in position and firmly bound by the same material as that used for preventing the elongation of the cleft.

be used for this purpose (clove hitch knot). With moderately large stocks it is quite unnecessary to tie the stock or bind the grafted parts together.

INSERTING THE SCIONS.

A small, narrow, hard, wooden wedge should be used for keeping the cleft open whilst the scions are being placed in position. On small vine stocks there is no necessity to wedge the stock open. The main essential in grafting is to ensure the exact juxtaposition of the cambium of stock and scion. The cambium is a thin tissue composed of generative cells (meristem) situated between the inner bark and the woody portion of the stock or scion. It suffices if the scion is inserted flush with the inner bark of the stock.

NOTE.—It is desirable to remove the rough outer bark at the point of union.

The scion or scions having been inserted, the wooden wedge is now removed, when the cleft closes, holding the scions firmly in position.

With small stocks the grafted parts should be firmly bound. The cut surface of the stock is preferably protected with a strip of waxed paper (made by dipping newspaper in moulten grafting wax, 1 part mutton fat, 2 parts beeswax, and 4 parts resin).

The whole of the grafted parts are now covered with a mound of earth several inches above the normal soil level. This mound drains off surplus water and prevents the grafted parts becoming dry. In other words it maintains conditions favourable to the formation of callus and the knitting process. In stiff soils which are liable to exclude air, it is desirable to cover the grafts with sandy soil provided for the purpose.

AFTER ATTENTION TO THE "GRAFTS."

The trellis should be erected before the grafts make very extensive growth. In cases where both scions have knitted successfully (where two scions have been used) one should be severed as soon as it becomes apparent that the other scion has been suitably cemented. One strong cane is allowed to grow to a height, which is regulated according to the method of training adopted and is then pinched to encourage the development of strong lateral shoots to enable the vine's shape to be established in the same season. All other growths are suppressed, unless more are desirable to provide against the possibility of the main cane being damaged.

The necessity of providing the trellis early in the season cannot be too strongly stressed, as any delay in the training or general attention necessary will almost invariably result in the vines being badly shaped.

A point worth stressing in the performance of the "whip tongue" graft is that a modification of the usually accepted method of making the graft is almost essential. The sloping oblique sections made on the stock cane and scion should be much longer than is generally advocated, in order to secure a firm union, and, further, this union must be strongly bound with raffia or similar material. For most purposes for which the "whip tongue" graft is employed these same sections are made fairly short, or abrupt, as in the diagram, in order to obtain a well cemented union. However, the necessary handling to which the grafted parts are subjected is considerable in this operation, and grafting by the adoption of short sections would be little short of impossible to effect with success. By using long sloping sections the stability of the graft union is assured, although the effectiveness of the union is to some extent sacrificed. This does not, however, detract from the value of the graft, because if performed well below normal soil level the scion will eventually make its own roots.

Of the two methods the writer prefers the use of "cleft" grafting on the resulting simple layered vines, on account of its comparative simplicity and effectiveness. Unless the "whip tongue" graft is performed with considerable care the percentage of failures will be fairly high.

AFTER TREATMENT OF THE GRAFTED VINES.

The new vine from the layered graft makes strong growth. One strong cane is retained, and this is pinched to develop laterals for forming the new vine, and these are supported by the trellis.

As soon as the layered vine develops fruiting wood, the parent vine in the following season is treated by removing it at a spot immediately above the offtake of the layer. In no instance must the connection between the roots of the parent vine and the layer be severed until such time as the old stump dies of its own accord. In the above methods of reconstruction it is preferable to collect and use scions from vines of proved fruiting habits.

CHANGING THE VARIETY WITHOUT THE LOSS OF A CROP.

A number of operations have from time to time been devised for the above purpose, but most of these, whilst they are possible, do not appear to have a practicable application.

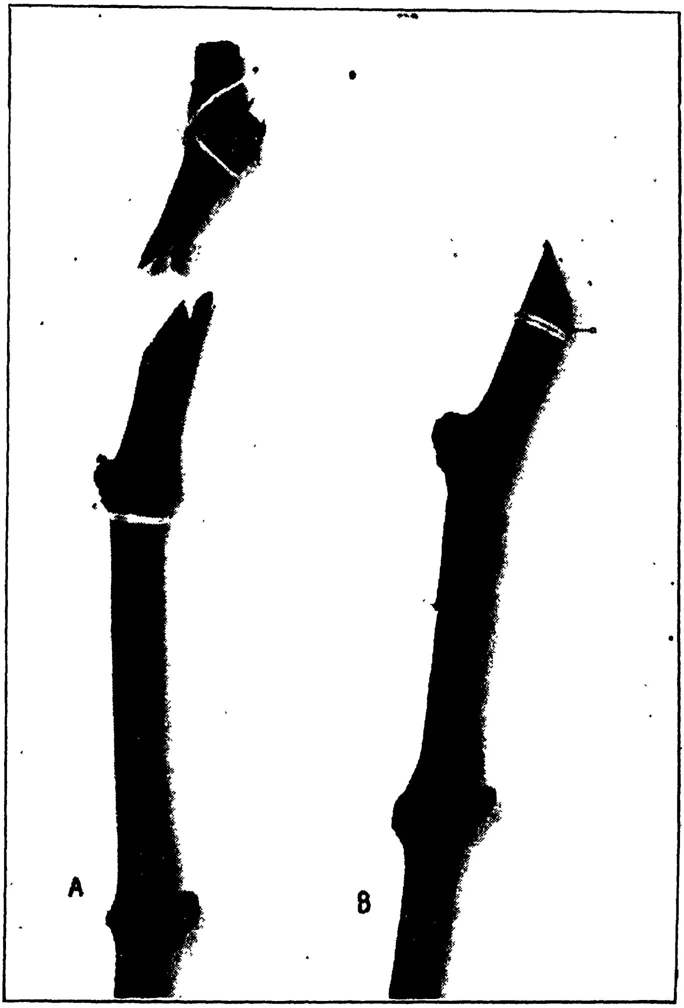


Fig. 3.—Showing details of the method of performing the Whip-tongue Graft. (The normal method of performing the Whip-tongue Graft.) A modification is desirable for the method outlined in these pages, viz., the sloping sections need to be considerably longer. A. The stock. B. The scion.

The method the writer has seen fit to advocate for a variety like "Shiraz" has been employed successfully by Mr. W. Arnst, at Angaston, South Australia, and appears to be a fairly satisfactory and practicable method.

The method would be very difficult to apply successfully on such upright varieties as "Mataro" and "Grenache," which are usually bush trained, but "Shiraz," on the other hand, is well adapted to this system.

The method entails (*a*) the use of the "whip-tongue" graft in conjunction with layering, or (*b*) the establishment of a layered vine at the foot of the parent vine; the vine so formed being in the following season grafted over to the desired variety by means of the "cleft" graft method.

(*a*) In this instance, the dual operation, *i.e.*, grafting and layering may be performed at two seasons, *viz.*, summer (March) and late winter (August).

(*b*) Where the scions fail to knit with the stock, a strong shoot from the layer may be grafted in the following spring by means of the "cleft" graft, or, if the grower prefers, all of the layered vines may be so treated.

Fig 4.—Showing he method of layering and grafting applicable to changing the variety without the loss of a crop. X shows the point at which the grafting operation is performed.

METHOD.

A fairly long and strong cane is taken from the parent vine and to this is "whip-tongue" grafted a portion of the cane of the desired variety. variety.

The accompanying illustrations will be adequate to describe the method of performing the graft, and with a little practice the operator will soon be able to effect the graft easily. It is preferable to effect the graft so that the union occurs as at x in the photograph, because in the case of the graft failing the layer will still make growth in the vegetative season and will provide a vine which may be later grafted by the "cleft" method.

SIMPLE LAYERING AS A MEANS OF RECONSTRUCTING OLD VINIFERA VINEYARDS.

Although this method does not include the grafting operation it is considered desirable to make some mention of the practice here.

A similar method has been adopted successfully by Zante currant growers in the non-irrigated districts of this State.

The "Zante currant" vine, after a period, suffers some considerable disability as the result of continued cincturing, and the vines eventually reach a stage where they become unprofitable.

In the past, this debility has also been partly the result of faulty methods of training and indifferent pruning. In this latter instance the writer refers to vines on which the main arms have been allowed to become permanently twisted around the trellis wires and also to the more or less customary practice of pruning currant vines too lightly, with the consequent poor development of fruiting wood and correspondingly poorly developed fruit. Whichever be the main reason for such debility matters little.

It will suffice to say that such vines usually produce strong water-shoots below the constriction caused by the cincture. One of these water-shoots may be utilised for rehabilitating such vines, with satisfactory results, by removing the top portion of the vines immediately above the water-shoot retained for the formation of the new vine.

This method has been made the subject of an experiment conducted by the Horticultural Branch of the Department of Agriculture, South Australia, at the instigation of Mr. A. V. Lyon, B.Sc., at Clare, Angaston, and South of Adelaide.

An alternative method of reconstruction, and, in the writer's opinion, a better method, is by means of simple layering.

This method of reconstructing currant vines is being compared in a trial with the simpler form of reconstruction, previously referred to, in Mr. G. Wishart's garden, at Angaston, and from accounts promises to be eminently satisfactory. The method is by no means a new one, and is of all methods the soundest, in that the new layered vine eventually makes its own root system, which should conceivably be in a much better condition than the root system of the debilitated parent vine. However, the roots of the parent vine gives to the new vine a very rapid start, necessitating at the most the loss of one season's crop.

A full season's crop need not necessarily be lost in this instance, as a new trellis wire can be supplied for the new vines, in which case the old vines need not be removed until the layered vine has developed fruiting wood, but should this be done the old vines should not be retained for more than one season, as it would obviously restrict the development of the new vines.

However, in most cases it appears sound policy to suffer the loss of one season's crop, as the grower will be recouped for this loss in the increased vigour and cropping of the new vines.

All photographs are by Mr. A. R. Hickinbotham, B.Sc., A.A.I.C., Agricultural College, Roseworthy.

PURE-BRED COWS COMPLETED OFFICIAL TEST

JUNIOR TWO-YEAR-OLDS—

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
Not allotted	Murray Glen Griselda Duchess ...	C. J. Morris, Monteith	Friesian	10/8/33
"	Murray Glen Princess Verbelle ...	C. J. Morris, Monteith	"	16/8/33
"	Glenowie Colantha May	H. Mountstephen, Monteith	"	21/9/33
"	Balaklava Repulse Bloom	A. E. Middleton, Balaklava	Jersey	2/9/33
"	Tuela Heath....................	F. Coleman, Saddleworth	"	5/7/33
"	Tuela Briar Rose................	F. Coleman, Saddleworth	"	5/8/33
"	Eudunda Lady Dawn............	W. S. McAuliffe	"	6/4/33
34530	Pella Pamela	C. E. Verco, Mount Compass	"	7/5/33
Not allotted	Tuela Lobelia..................	F. Coleman, Saddleworth	"	19/7/33
34482	Sweet Haven Mercedes Viola	H. Follett, Langhorne's Creek	"	5/9/33
34647	Hampden Just It	J. A. J. Pfitzner, Hampden	"	30/8/33
Not allotted	Roseworthy Rose	Agricultural College, Roseworthy..	"	12/5/33
34483	Sweet Haven Noble Duchess	J. M. Bray, Langhorne's Creek....	"	3/7/33
Not allotted	Tuela Diplacus	F. Coleman, Saddleworth	"	5/8/33
34481	Sweet Haven Mercedes Carnation .	H. Follett, Langhorne's Creek	"	16/9/33
Not allotted	Hampden Noble's Guitar	J. A. J. Pfitzner, Hampden	"	25/7/33
"	Dalkey Bonny Lass	G. D. Oster, Balaklava	"	10/7/33
"	Lanacoona Carnation Kelly	C. E. Verco, Mount Compass	"	29/8/33
"	Overlook Remus Spark	E. W. Pfitzner, Eudunda	"	7/7/33
"	Balaklava Griselda Sylvia	A. E. Middleton, Balaklava	Friesian	19/5/33
"	Tuela Maple	F. Coleman, Saddleworth	Jersey	3/7/33
"	Roseworthy Sciential 4th	Agricultural College, Roseworthy..	"	5/6/33
"	Tuela Larch	F. Coleman, Saddleworth	"	10/7/33
"	Glandore Lismore	W. A. Mueller, Ambleside	"	3/9/33
"	Glen Ewin Morn's Mayflower	Jas. McEwin, Houghton	"	3/7/33
"	Glen Ewin Misty Morn...........	R. J. Laing, Gumeracha	"	7/5/33
"	Ontario Violet	T. B. Brooks, Clarendon	"	27/7/33
"	Morella Princess	H. R. Walsh, Salisbury	"	4/8/33
"	Alexandra Bonny Janet..........	A. Kelly, Milang	"	2/8/33
"	Cudlee Creek Jane Grey..........	Mrs. E. A. Pool, Cudlee Creek	"	4/9/33
38621	Woodside Wonderful Maid	J. A. J. Pfitzner, Hampden	"	1/4/33
Not allotted	Tuela Rose	F. Coleman, Saddleworth	"	4/8/33
34690	Wooroora Waffles	A. B. Sieber, Eudunda	"	11/4/33
Not allotted	Xavier Valda 2nd	A. P. Spehr, Mount Gambier	"	30/5/33
"	Eudunda Adina	W. S. McAuliffe, Eudunda	"	30/3/33
"	Fernden Lady Combine	O. H. Woodward, Port Pirie	"	2/6/33
"	Tuela Spartium	F. Coleman, Saddleworth	"	17/7/33
"	Lakeland Sylvette	R. J. Laing, Gumeracha	"	7/8/33
42086	Sweet Haven Enchantress	J. M. Bray, Langhorne's Creek ...	"	22/7/33
Not allotted	Para Wirra Cherry's Snowflake ...	J. H. Dawkins, Gawler	"	11/7/33
"	Mira Chana Gem	H. B. Peters, Mount Compass	"	13/8/33
5424	Long Flat Lucy 2nd	Mrs. W. J. Spackman, Long Flat .	A.I.S.	17/9/33
Not allotted	Anama Alcartra Gleam	W. Hawker, Clare	Friesian	10/7/33
"	Balaklava Collegian's Rosemary ..	A. E. Middleton, Balaklava	Jersey	22/9/33
"	Delma Bonny Countess	E. W. Pfitzner, Eudunda	"	4/8/33
"	Wooroora Twinkles.............	A. Kelly, Milang	"	7/4/33
"	Timbungalung Daphne	Mrs. D. G. Steven, Kooringa	"	4/9/33
"	Sunnybrook Gertie	J. J. Farrow, Gawler	A.I.S.	18/8/33
"	Glen Belah Bertha	E. O. Hancock, Andrews	Ayrshire	3/7/33
"	Overlook Remus Oxulla..........	E. W. Pfitzner, Eudunda	Jersey	20/7/33
"	Kyby Kathleen	Government Experimental Farm, Kybybolite	Ayrshire	24/8/33
34526	Pella Lotus Lilly	W. P. Eckermann, Eudunda......	Jersey	16/7/33
Not allotted	Gum Hill Rosette's Bell	P. O. Schutz, Eudunda	"	30/6/33
8280	Kiama Mayflower 8th	E. & A. Nicholls, Woodville	A.I.S.	5/8/33
Not allotted	Kyby Brilliant	Government Farm, Kybybolite ...	Ayrshire	16/4/33
40157	Hampden Pretty May	A. B. A. Weckert, Brinkworth ...	Jersey	10/5/33
5332	Dunleith Viola	Dunleith Pastoral Co., Ashbourne	A.I.S.	14/7/33
Not allotted	Morella Damsel 6th †	H. R. Walsh, Mount Barker	Jersey	15/8/33
"	Timbungalung Dewdrop	Mrs. A. M. Carruthers, Narrung ..	"	11/4/33
5328	Dunleith Marigold..............	Dunleith Pastoral Co., Ashbourne	A.I.S.	2/8/33
41498	Para Vale Cherry Starbright	A. J. Marrett, Saddleworth	Jersey	14/7/33
Not allotted	Kyby Heroine	Government Farm, Kybybolite ...	Ayrshire	26/8/33
"	Tuela Columbine	F. Coleman, Saddleworth	Jersey	27/6/33

† Tenth tests were required for the cows marked thus :—†, but could not be obtained.

BETWEEN JANUARY 1ST AND JUNE 30TH, 1934.

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 230LBS.						
1 11 13	11,485½	3·72	427·25	273	Glenowie Netherland Prince II.	—
2 0 5	9,802½	4·24	416·07	273	River Glen Lord Echo Griselda	—
1 10 6	11,067	3·67	406·52	273	Glenowie Colantha Netherland	—
1 8 2	7,465½	5·16	385·30	273	Balaklava Rhodesia's Repulse	—
1 11 11	6,931½	5·33	369·63	273	Hampden Winsome King	—
1 11 2	6,351½	5·82	369·60	273	Hampden Winsome King	—
1 7 29	5,442	6·64	361·57	273	Eudunda Star of Dawn	—
1 10 1	6,406½	5·42	347·56	273	Dalebank Noble Duke	—
2 0 2	5,617½	6·01	337·69	273	Hampden Winsome King	—
2 1 14	6,360	5·27	335·34	273	Dalebank Mercedes Duke	—
2 2 26	5,557½	6·01	333·78	273	Bellefaire Blonde's Aristocrat	—
2 3 3	5,992½	5·51	329·99	273	Roseworthy Templar	—
1 11 15	5,434½	5·92	321·84	273	Dalebank Mercedes Duke	—
2 0 11	6,063½	5·26	319·07	273	Hampden Winsome King	—
1 11 18	5,772	5·51	318·09	273	Dalebank Mercedes Duke	—
1 10 14	5,491½	5·74	315·38	273	Bellefaire Blonde's Aristocrat	—
1 8 18	5,323½	5·84	310·90	273	Bellefaire Blonde's Aristocrat	—
1 5 21	5,889	5·26	309·86	273	Melvin Noble 2nd	—
1 9 17	5,439	5·69	309·60	273	Overlook Favourite Remus	—
2 1 27	9,132	3 38	308·84	273	Glenowie Beets Griselda	—
1 11 22	6,323½	4·88	308·57	273	Hampden Winsome King	—
2 3 28	5,662½	5·31	300·96	273	Mercedes Sweet Duke of Glen Iris	—
1 11 29	5,983½	5·02	300·46	273	Tuela Syra	—
2 2 11	5,244	5·72	299·93	273	Morella Tulip's Neat Lad	—
1 9 13	4,597½	6·47	297·26	273	Werribee Masterman	—
1 8 14	5,148	5·74	295·70	273	Werribee Masterman	—
1 9 19	5,875½	4·98	292·82	273	Dalebank Viola's Duke	—
1 11 11	4,818	6·07	292·59	273	Morella Anemone's Chief 5th	—
2 0 5	5,472½	5·33	291·53	273	Hampden Queen's Repeater	—
1 7 16	4,609½	6·28	289·71	273	Producer 3rd of Dalebank	—
1 11 2	5,272½	5·49	289·36	273	Woodside Palatine Boy	—
1 8 6	5,196½	5·56	288·86	273	Tuela Syra	—
1 8 20	5,571	5·17	287·92	273	Delma Butter King	—
1 10 16	7,194	3·96	285·25	273	Clarendon Eyre Eminent's Happy Husband	—
1 7 17	5,182½	5·49	284·80	273	Eudunda Star of Dawn	—
1 11 26	5,187	5·49	284·53	273	Fernden Twylish Combination	—
1 11 28	5,209½	5·45	283·93	273	Hampden Winsome King	—
1 9 19	5,593½	5·01	280·37	273	Timbungalung Airboy	—
1 6 16	6,420	4·36	279·90	273	Dalebank Producer 8th	—
2 1 16	5,355	5·20	278·22	240	Snowflake's Chief of Para Wirra	†
1 8 25	5,067	5·48	277·66	273	Lakeland Golden Masterpiece	—
2 1 26	7,210½	3·80	274·36	273	Ruth's Limelight of Wangara	—
2 3 15	8,941½	3·07	274·26	273	Anama Netherland Count	—
1 11 22	5,079	5·39	273·71	273	Balaklava Skylee's Collegian	—
2 5 27	4,557	5·97	272·08	273	Beauty's King of Somerville	—
1 10 2	4,813½	5·63	271·16	273	Wollingurry Cavalier's Silver King	—
2 3 27	5,026½	5·38	270·49	273	Timbungalung Airman	—
2 1 3	6,565½	4·11	270·05	273	Wangara Swallow's Victor	—
1 9 21	6,190½	4·35	269·10	273	Gowrie Park Dairyman	—
1 8 21	5,277	5·08	267·98	273	Overlook Favorite Remus	—
2 5 3	6,810	3·90	265·87	273	Gowrie Park Scottish Dandy	—
1 11 23	4,939½	5·31	262·26	273	Dalebank Noble Duke	—
2 0 6	4,986	5·21	260·02	273	Hampden Carnation's Lad	—
2 0 4	6,666	3·87	257·97	273	Pembroke of Greyleigh	—
2 0 11	6,264	4·11	257·29	273	Gowrie Park Scottish Dandy	—
1 8 1	4,300	5·97	256·68	240	Hampden Olive's King	Withdrawn
2 4 29	6,525	3·88	253·25	273	Sultan of East View	—
1 11 24	5,089½	4·90	249·31	273	Morella Anemone's Chief 5th	—
2 0 9	5,031	4·92	247·70	273	Timbungalung Butter King	—
2 3 18	7,455	3·31	246·72	240	Sultan of East View	Withdrawn
1 11 4	4,873½	5·03	245·26	273	Para Wirra Cherry Pylon	—
1 11 13	5,445	4·47	243·36	273	Ida's Laird of Gowrie Park	—
1 10 27	4,035	6·02	243·02	273	Hampden Winsome King	—

therefore the cows concerned have been credited with only 240 days production.

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			Junior Two-Year-Olds—	
2980	Woodside Maisie	S. W. Burns, Woodside	Guernsey	21/8/33
Not allotted	Delma Twilight	E. W. Pfitzner, Eudunda	Jersey	13/9/33
"	Glen Ewin White Rose	Jas. McEwin, Houghton	"	31/7/33
"	Morella Viola 3rd	H. R. Walsh, Mount Barker	"	26/7/33
"	Gum Hill Queen	P. O. Schutz, Eudunda	"	7/6/33
"	Gambier Alden's Una	A. P. Spehr, Mount Gambier	"	20/7/33
"	Cudlee Creek Day Dawn	Mrs. E. A. Pool, Cudlee Creek	"	5/4/33
8283	Kiama Robin 4th	E. and A. Nicholls, Woodville	A.I.S.	–/7/33
5330	Dunleith Primula	Dunleith Pastoral Co., Ashbourne.	"	2/8/33
38616	Woodside Golden Maid	Jas. McEwin, Houghton	Jersey	2/5/33
Not allotted	Sunnybrae Blanche	E. O. Hancock, Andrews	Ayrshire	12/7/33
"	Pembroke Lady Lotus	Mrs. C. W. Ansell, Bletchley	Jersey	12/8/33
"	River Glen Pride	S. N. Bott, Murray Bridge	A.I.S.	19/8/33
"	Kyby Oread	Government Farm, Kybybolite	Ayrshire	24/9/33
"	Kyby Verna	Government Farm, Kybybolite	"	30/8/33
3778	Glenlea Lilac	E. T. Vinall, Brighton	Guernsey	18/9/33
Not allotted	Dunleith Briar	Dunleith Pastoral Co., Ashbourne.	A.I.S.	4/8/33
"	Kyby Ailsa	Government Experimental Farm, Kybybolite	Ayrshire	2/8/33
"	Glen Ewin Princess Molly	Mrs. D. G. Steven, Kooringa	Jersey	16/7/33
39483	Cumberland Damsel	L. W. Frost, Saddleworth	"	19/9/33
Not allotted	Kyby Roslin	Government Farm, Kybybolite	Ayrshire	9/8/33
"	Kyby Rosemary	Government Farm, Kybybolite	"	26/9/33
"	Kyby Buttercup	Government Farm, Kybybolite	"	3/4/33
"	Cumberland Silverbelle 2nd	L. W. Frost, Saddleworth	Jersey	16/8/33
8258	The Bluff Plum	H. B. Kuchel, Murray Bridge	A.I.S.	21/7/33
Not allotted	Pembroke Duchess 4th	Mrs. C. W. Ansell, Bletchley	Jersey	21/9/33
"	Kirami Dawn	R. J. Laing, Gumeracha	"	18/10/33
"	Hazelbrook Holly	J. N. Reid, Oakbank	Ayshire	10/7/33
5331	Dunleith Tulip	Dunleith Pastoral Co., Ashbourne	A.I.S.	30/7/33
Not allotted	Oakhill Mayflower	Mrs. M. I. Dittrich, Hampden	Jersey	22/7/33
"	Hampden Blonde's Snowdrop	G. E. McDonald, Burra	"	21/8/33
"	Kyby Olive	Government Experimental Farm, Kybybolite	Ayrshire	12/8/33
"	Glen Ewin Lady Clementine	J. McEwin, Houghton	Jersey	14/8/33
"	Oakhill Nannette	Mrs. M. I. Dittrich, Hampden	"	20/7/33
"	Hazelbrook Rance	J. N. Reid, Oakbank	Ayrshire	4/8/33
"	River Glen Clarabelle 2nd	S. N. Bott, Murray Bridge	A.I.S.	23/10/33
34688	Wooroora Dutini	A. B. Sieber, Eudunda	Jersey	22/12/33
Not allotted	Hazelbrook Heather	J. N. Reid, Oakbank	Ayrshire	8/10/33
"	Kyby Sybal	Government Farm, Kybybolite	Ayrshire	3/9/33
39671	Eudunda Bramble	W. S. McAuliffe, Eudunda	Jersey	1/1/34
Not allotted	Ninyeri Bright Star	E. L. Goode, Narrung	"	12/2/34
39502	Delma Dora	E. W. Pfitzner, Eudunda	"	6/3/34
			Senior Two-Year-Olds—	
34500	Tuela Gaillardia	F. Coleman, Saddleworth	Jersey	7/7/33
34529	Pella Mercedes Kelly	C. E. Verco, Mount Compass	"	22/9/33
34480	Crofton Sunny Morn	H. & A. Bohme, Balhannah	"	25/9/33
34505	Tuela Schizanthus	F. Coleman, Saddleworth	"	8/9/33
34664	Roseworthy Lady 4th	Agricultural College, Roseworthy	"	15/6/33
34493	Tuela Daisy	F. Coleman, Saddleworth	"	28/8/33
34663	Roseworthy Glimmer	Agricultural College, Roseworthy	"	15/6/33
34518	Para Wirra Sunrise 2nd	J. H. Dawkins, Gawler	"	13/8/33
34591	Glen Ewin Rosebud	J. McEwin, Houghton	"	21/8/33
34525	Pella Golden Lotus	W. A. Mueller, Ambleside	"	11/8/33
Not allotted	Eudunda Nancy	W. S. McAuliffe, Eudunda	"	28/5/33
31093	Brinkworth Rae	C. C. T. Ottens, Brinkworth	"	4/4/33
3238	Wollongbar Nannette 2nd	S. W. Burns, Woodside	Guernsey	2/9/33
34582	Alexandra Janet's Olive	A. Kelly, Milang	Jersey	1/8/33
34585	Eudunda Fern	W. S. McAuliffe, Eudunda	"	12/4/33
5294	River Glen Clarabelle	S. N. Bott, Murray Bridge	A.I.S.	17/9/33

† Tenth tests were required for the cows marked thus :—†, but could not be obtained,

* The dates of calving of the cows marked * could not be checked, as

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butter fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 280LBS.—*continued.*						
1 11 28	4,234½	5·70	241·49	273	Wollongbar Brutus	—
2 5 14	4,836	4·93	238·53	273	Beauty's King of Somerville	—
1 6 17	4,222½	5·60	236·44	273	Brucevale Lord Fancy's Starbright	—
1 11 21	4,395	5·37	236·16	273	Anemone's Chief of Morella	*
1 10 11	4,522½	5·19	234·57	273	Pella Northwood Cavalier	—
1 7 1	4,135½	5·66	234·27	273	Les Sentes Lord Alden	—
1 9 12	5,208	4·49	233·84	273	Producer 3rd of Dalebank	*
1 10 —	6,091½	3·84	233·69	273	Pembroke of Greyleigh	
2 3 23	6,529½	3·56	232·66	273	Sultan of East View	—
1 11 1	4,719	4·91	231·64	273	Pioneer's Lad	—
2 3 19	5,766	3·98	229·20	273	Scotswood Idler	—
2 0 9	4,414½	5·18	228·68	273	Twylish of Para Wirra	—
1 4 2	6,225	3·66	227·66	150	Wangara Dorrie's Royal	Withdrawn*
1 10 12	5,440½	4·17	226·84	273	Loyalty of Bridge View	—
1 11 21	5,175	4·35	225·21	240	Gowrie Park Scottish Dandy	†*
2 4 2	4,722	4·74	223·96	273	Glenlea Hilda's Valour 2nd	—
2 5 12	6,000	3·71	222·45	240	Eastview Sultan	Withdrawn
1 11 14	4,502	4·89	220·32	273	Loyalty of Bridge View	*
1 5 25	3,881	5·66	219·85	273	Werribee Masterman	
2 1 15	4,135½	5·25	217·04	273	Silver Lad of Eudunda	*
1 11 29	5,179½	4·13	213·87	273	Gowrie Park Scottish Dandy	—
1 11 19	4,613	4·33	199·67	273	Gowrie Park Ida's Laird	*
2 1 21	5,206½	3·93	204·51	273	Gowrie Park Scottish Dandy	—
2 3 1	3,591	5·59	200·79	273	Silver Lad of Eudunda	—
1 7 28	4,707	4·21	197·98	273	Wangara Swallow's Limelight 3rd	—
2 0 26	3,942	4·98	196·39	273	Twylish of Para Wirra	—
1 11 17	3,225	5·76	185·86	210	Lakeland Golden Masterpiece	Withdrawn
2 0 7	4,755	3·85	183·29	210	Beleura Federal	Sold
2 3 0	5,115	3·46	177·14	240	Sultan of East View	Withdrawn
1 10 28	3,202½	5·23	167·52	210	Carnation's Lad of Dalebank	Disposed of *
1 7 26	3,090	5·42	167·38	180	Bellefaire Blonde's Aristocrat	Unable to finish test
2 1 0	3,390	4·26	144·30	240	Gowrie Park Scottish Dandy	Dry *
1 6 15	2,655	5·07	134·51	210	Brucevale Lord Fancy Starbright	Withdrawn
1 8 8	3,255	4·36	141·77	210	Oakhill Prince	Disposed of
1 11 18	3,705	3·46	128·29	180	Beleura Federal	Sold
2 0 13	3,540	3·59	127·01	90	Wangara Dorrie's Royal	Exemption
2 5 0	2,010	6·26	125·87	120	Wollingurry Cavalier Silver King	Sold
1 10 18	3,150	3·78	119·15	120	Beleura Federal	Sold
1 11 14	2,595	4·00	103·81	150	Gowrie Park Scottish Dandy	Dry
2 2 18	1,440	6·20	89·22	90	Stonyfell Rambler	Sold
2 1 22	1,560	5·00	78·03	120	Hampden Mayflower King	Withdrawn
1 9 21	1,170	5·47	63·99	90	Delma Butter King	Withdrawn
BUTTERFAT STANDARD, 250LBS.						
2 10 12	7,036½	6·17	434·38	273	Hampden Winsome King	—
2 8 15	8,310	4·98	413·57	273	Dalebank Noble Duke	—
2 7 10	7,956	5·09	404·80	273	Butter King of Pella	—
2 11 28	7,113	5·62	399·84	273	Brinkworth Chris	—
2 11 7	7,944½	5·00	397·35	273	Mercedes Sweet Duke of Glen Iris	
2 9 19	6,826½	5·76	393·33	273	Brinkworth Chris	—
2 8 24	6,067½	6·45	391·28	273	Mercedes Sweet Duke of Glen Iris	—
2 10 10	6,633½	5·68	377·00	273	Banyule Pylon	—
2 8 2	6,211½	5·80	359·98	273	Brucevale Lord Fancy Starbright	—
2 7 22	6,306	5·70	359·41	273	Dalebank Noble Duke	—
2 8 28	5,545½	6·45	357·90	273	Stonyfell Rambler	—
2 11 9	5,671½	6·13	347·45	273	Hampden Olive's King	—
2 10 20	5,838½	6·35	339·14	273	Wollongbar Adonis	—
2 11 21	6,733½	4·98	335·16	273	Hampden Olive's King	—
2 7 1	6,792	4·90	333·06	273	Stonyfell Rambler	—
2 11 19	7,768½	4·16	322·95	273	Wangara Dorrie's Royal	—

therefore the cows concerned have been credited with only 240 days production.
.calving dates had not been supplied to the Herd Book Societies concerned.

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
				SENIOR TWO-YEAR-OLD.—BUTTERFAT
Not allotted	Sweet Haven Mercedes Bloom 2nd	J. M. Bray, Langhorne's Creek....	Jersey	25/8/33
"	Para Wirra Iris Queen 2nd	J. H. Dawkins, Gawler	"	13/6/33
"	Pella Carnation	W. P. Eckermann, Eudunda......	"	9/4/33
38619	Woodside Mabel's Countess.......	A. B. Sieber, Eudunda	"	10/4/33
34639	Delma Duchess	E. W. Pfitzner, Eudunda	"	16/7/32
Not allotted	Channel View Miss Grey	Mrs. A. M. Carruthers, Narrung ..	"	2/8/33
"	Oakhill Pimpernel 5th	Mrs. M. I. Dittrich, Hampden	"	10/5/33
5426	Long Flat Mermaid	Mrs. W. J. Spackman, Long Flat..	A.I.S.	5/7/33
34609	Oakhill Lady Lobelia	Mrs. M. I. Dittrich, Hampden	Jersey	8/8/33
Not allotted	Hazelbrook Elaine	J. N. Reid, Oakbank	Ayrshire	28/7/33
39792	Glandore Treasure	J. J. O'Sullivan, Tarlee	Jersey	14/8/33
35305	Austral Park Sparklett	H. R. Walsh, Mount Barker	"	21/8/33
Not allotted	Kyby Wynette	Government Experimental Farm, Kybybolite	Ayrshire	26/7/33
34569	Burnlea Glory 5th..............	J. M. Hudd, Bletchley	Jersey	11/6/33
39793	Glandore Tulip	J. J. O'Sullivan, Tarlee	"	7/8/33
34597	Para Vale Columbine	A. J. Marrett, Saddleworth	"	22/11/33
				JUNIOR THREE-YEAR-OLDS—
2293	River Glen Violet	S. N. Bott, Murray Bridge	A.I.S.	20/7/33
31144	Lanacoona Miss Kelly	C. E. Verco, Mount Compass	Jersey	6/7/33
34491	Tuela Anchusa..................	F. Coleman, Saddleworth	"	13/8/33
34510	Tuela Waratah 4th	F. Coleman, Saddleworth	"	12/9/33
31136	Wooroora Lassie	A. B. Sieber, Eudunda	"	4/7/33
34633	Lakeland Capture	H. B. Peters, Mount Compass	"	5/9/33
31016	Crofton Mavourneen	H. and A. Bohme, Balhannah	"	6/7/33
34652	Cudlee Creek Fairy Queen 2nd ...	Mrs. E. A. Pool, Cudlee Creek	"	25/7/33
34669	Roseworthy Princess 44th	Agricultural College, Roseworthy..	"	21/8/33
38614	Woodside Dreaming Satisfaction .	A. B. Sieber, Eudunda	"	14/4/33
34651	Cudlee Creek Columbine's Pearl ..	G. D. Oster, Balaklava	"	8/7/33
34508	Tuela Stephanotis	F. Coleman, Saddleworth	"	13/9/33
34672	Roseworthy Sciential 3rd	Agricultural College, Roseworthy..	"	12/8/33
34322	Delma Sweet Lotus	E. W. Pfitzner, Eudunda.........	"	12/7/33
28128	Eudunda Rhonda's Glory	W. S. McAuliffe, Eudunda	"	10/7/33
34584	Wooroora Lady Pride	A. Kelly, Milang	"	29/6/33
31108	Hampden Melody	G. D. Oster, Balaklava	"	11/9/33
34653	Lakeland Lady Grey	J. Francis & Son, Bugle Ranges ...	"	2/7/33
Not allotted	Malwand Viola 2nd.............	A. P. Spehr, Mount Gambier	"	25/7/33
31137	Wooroora Princess Lotus.........	A. B. Sieber, Eudunda	"	5/4/33
Not allotted	Sunnybrae Melvina	E. O. Hancock, Andrews	Ayrshire	7/9/33
31097	Delma Dorothy	E. W. Pfitzner, Eudunda.........	Jersey	24/5/33
5423	Long Flat Lucy	Mrs. W. J. Spackman, Long Flat ..	A.I.S.	8/10/33
41556	Pembroke Madge	Mrs. C. W. Ansell, Bletchley......	Jersey	10/8/33
2799	Glenlea Wenonah 2nd	E. T. Vinall, Brighton	Guernsey	8/5/33
31022	Channel View Rose	Mrs. A. M. Carruthers, Narrung ..	Jersey	8/5/33
Not allotted	Kyby Snow Queen	Government Farm, Kybybolite ...	Ayrshire	16/5/33
"	Kyby Annie	Government Farm, Kybybolite ...	Ayrshire	25/5/33
"	Pembroke Dawn	Mrs. C. W. Ansell, Bletchley	Jersey	29/8/33
5329	Dunleith Millie	Dunleith Pastoral Co., Ashbourne	A.I.S.	31/8/33
Not allotted	Kyby Brunette	Government Farm, Kybybolite ...	Ayrshire	20/7/33
"	Kyby Revel	Government Farm, Kybybolite ...	"	27/5/33
5325	Dunleith Fairy	Dunleith Pastoral Co., Ashbourne	A.I.S.	16/8/33
34570	Burnlea Moreen	J. M. Hudd, Bletchley	Jersey	10/6/33
41553	Pembroke Bonny Lotus	Mrs. C. W. Ansell, Bletchley	"	19/10/33
Not allowed	Pella Carnation	W. P. Eckermann, Eudunda......	"	26/2/34
2352	Northfield Royal Flirt	Insp.-General Hospitals, Northfield	A.I.S.	14/4/33
				SENIOR THREE-YEAR-OLDS—
34327	Melvin Viola 2nd...............	C. E. Verco, Mount Compass	Jersey	19/8/33
34509	Tuela Swainsonia	F. Coleman, Saddleworth	"	3/4/33
2291	River Glen Dianthus	S. N. Bott, Murray Bridge	A.I.S.	15/7/33
34497	Tuela Didiscus	F. Coleman, Saddleworth	Jersey	26/7/33
31104	Hampden Lady Olive............	J. A. J. Pfitzner, Hampden	"	24/6/33
Not allotted	Glenowie May Echo	H. Mountstephen, Monteith	Friesian	22/7/33
38169	Glen Avon Princess	A. P. Spehr, Mount Gambier	Jersey	9/9/33
34504	Tuela Sage	F. Coleman, Saddleworth	"	24/8/33
31082	Para Vale Queen	Mrs. D. S. Steven, Kooringa	Jersey	9/4/33
Not allotted	Talmont Stella.................	E. O. Hancock, Andrews	Ayrshire	17/7/33

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 250LBS.—*continued.*						
2 11 14	6,648½	4·82	320·30	273	Dalebank Mercedes Duke	—
2 10 25	6,390	5·00	319·38	273	Para Wirra Maglona Twylish II.	—
2 7 6	6,306	5·06	319·13	273	Dalebank Noble Duke	—
2 7 1	6,427½	4·87	312·89	273	Anemone's Lily Oxford	—
2 9 26	6,211½	5·02	311·68	273	Beautys King of Somerville	—
2 9 9	6,024	5·16	310·66	273	Makarini of Dalebank	—
2 11 4	4,560	6·27	285·76	273	Carnation's Lad of Dalebank	—
2 9 20	7,050	3·94	277·59	273	Ruth's Limelight of Wangara	—
2 10 1	4,744½	5·69	270·04	273	Oakhill Duke	—
2 11 4	6,774	3·79	256·62	273	Beleura Federal	—
2 10 21	4,623	5·50	254·13	273	Morella Tulip's Neat Lad	—
2 7 1	4,101	5·98	245·45	273	Trecarne Sheik	—
2 11 20	5,333	4·00	213·36	273	Gowrie Park Scottish Dandy	—
2 11 11	3,750	5·40	202·63	240	Boroni of Rockness	Withdrawn
2 7 17	3,393	5·30	179·67	273	Morella Tulip's Neat Lad	—
2 9 22	2,265	4·56	103·33	120	Para Wirra Cherry Pylon	Dead
BUTTERFAT STANDARD, 270LBS.						
3 1 22	11,109	4·36	484·31	273	Wangara Dorrie's Royal	—
3 1 3	9,133½	5·14	469·84	273	Dalebank Noble Duke	—
3 0 27	8,535½	5·28	450·40	273	Hampden Winsome King	—
3 0 18	9,033	4·89	441·96	273	Brinkworth Chris	—
3 4 22	7,468½	5·87	438·18	273	Wollingurry Cavalier's Silver King	—
3 3 12	8,263½	5·12	423·05	273	Demetrius of Tuela	—
3 2 25	7,138½	5·73	408·82	273	Butter King of Pella	—
3 1 24	8,134½	4·99	405·94	273	Producer 3rd of Dalebank	—
3 0 2	7,659½	5·21	398·75	273	Mercedes Sweet Duke of Glen Iris	—
3 0 11	7,675½	5·16	395·89	273	Dreaming Bob	—
3 3 3	6,856½	5·74	393·80	273	Producer 3rd of Dalebank	—
3 1 6	7,887½	4·98	393·21	273	Hampden Winsome King	—
3 5 27	7,491	5·13	384·49	273	Mercedes Sweet Duke of Glen Iris	—
3 5 18	7,341	5·19	380·85	273	Beauty's King of Somerville	* —
3 5 13	6,945	5·45	378·79	240	Myrtle Bank Kate's Chief	Dry
3 0 7	5,616	6·65	373·32	273	Wollingurry Cavalier's Silver King	—
3 5 18	6,520½	5·44	354·62	273	Hampden Olive's King	—
3 1 8	7,012½	4·81	337·11	273	Timbungalung Lord Clement	—
3 0 2	7,117½	4·67	332·46	273	Belgonia Duke	—
3 1 22	5,038½	6·53	329·17	273	Wollingurry Cavalier's Silver King	—
3 3 20	8,194½	3·93	321·72	273	Warook Federal	—
3 5 15	5,412	5·69	307·70	273	Beauty's King of Somerville	—
3 3 9	8,580	3·57	306·04	240	Ruth's Limelight of Wangara	Withdrawn
3 0 16	5,344½	5·69	304·15	273	Twylish of Para Wirra	—
3 3 1	5,392½	5·36	289·07	273	Glenlea Hilda's Valour 2nd	—
3 3 28	5,740½	4·93	283·29	273	Makarini of Dalebank	—
3 1 0	6,195	4·35	269·72	273	Ida's Laird of Gowrie Park	—
3 2 16	5,910	4·49	265·09	273	Gowrie Park Scottish Dandy	*
3 0 4	4,515½	5·44	245·58	273	Para Wirra Twylish	—
3 4 26	6,450	3·70	238·58	210	Merger of Melross	Withdrawn
3 3 17	5,505	4·07	223·82	180	Gowrie Park Scottish Dandy	* Dry
3 1 16	5,610	3·73	209·39	240	Gowrie Park Scottish Dandy	* Dry
3 3 3	5,400	3·79	204·67	210	Mariner of Greyleigh	Withdrawn
3 1 26	3,375	5·56	187·73	240	Mack of Glenford	* Withdrawn
3 2 8	3,225	5·21	168·12	210	Para Wirra Twylish	Withdrawn
3 5 23	2,550	4·92	125·54	120	Dalebank Noble Duke	Withdrawn
3 9 28	3,009	3·81	114·67	273	Janet's Royal of Northfield	—
BUTTERFAT STANDARD, 290LBS.						
3 11 8	10,917	5·48	598·67	273	Retford Julian	
3 6 21	8,353½	5·82	486·31	273	Baron of Dalebank	—
	10,222½	5·93	606·50	365		
3 10 26	11,986½	3·91	468·30	273	Joffre of Brenda Park	—
3 11 1	8,607	5·43	467·04	273	Baron of Dalebank	*
3 8 13	8,641½	5·35	462·33	273	Mayflower's Lad of Hampden	—
3 9 16	10,896	4·18	456·0C	273	Murray Glen Prince Wooraki	—
3 9 11	7,521½	5·27	396·59	273	Murta Lloyd	—
3 11 3	7,299	5·34	389·63	273	Baron of Dalebank	—
3 7 29	6,474	5·86	379·49	273	Werribee Combination	—
3 8 16	7,718	4·89	377·44	273	Beleura Captain	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
		SENIOR THREE-YEAR-OLDS.—BUTTERFAT		
31045	Llangollen Marge	J. Francis & Son, Bugle Ranges	Jersey	20/7/33
31052	Cumberland Silver Lady	L. W. Frost, Saddleworth	Jersey	11/6/33
5378	Liberton Flash 2nd	E. & A. Nicholls, Woodville	A.I.S.	23/8/33
Not allotted	Kyby Ornate	Government Farm, Kybybolite	Ayrshire	21/9/33
34486	Ontario Kitty	T. B. Brooks, Clarendon	Jersey	26/6/33
2497	Wollongbar Maisie	S. W. Burns, Woodside	Guernsey	29/8/33
31063	Burnlea Glory 3rd	J. M. Hudd, Bletchley	Jersey	13/5/33
31132	Gum Hill May	P. O. Schutz, Eudunda	"	10/6/33
34604	Balaklava Collegian's Rosette	A. E. Middleton, Balaklava	"	23/9/33
34698	Fernden Lady Bell	E. O. Traeger, Eudunda	"	19/5/33
34473	Pembroke Patience	Mrs. C. W. Ansell, Bletchely	"	3/9/33
31081	Para Vale Lucy	A. J. Marrett, Saddleworth	"	8/10/33
34674	Roseworthy Sunset	Agricultural College, Roseworthy	"	20/8/33
5326	Dunleith Gentle	Dunleith Pastoral Co., Ashbourne	A.I.S.	9/10/33
Not allotted	Balaklava Griselda Posch	A. E. Middleton, Balaklava	Friesian	21/12/33
34562	Burnlea Blandina 3rd	J. M. Hudd, Bletchley	Jersey	25/1/34
34568	Burnlea Glory 4th	J. M. Hudd, Bletchley	"	7/3/34
		JUNIOR FOUR-YEAR-OLDS —		
5371	Kiama Robin 2nd	E. and A. Nicholls, Woodville	A.I.S.	9/7/33
18571	Pride 3rd of Elderslie	Mrs. W. J. Spackman, Long Flat	"	20/9/33
Not allotted	Roads End Corcyra	W. Hawker, Clare	Friesian	26/8/33
23700	E. L. Rimal Surprise	E O Hancock, Andrews	Ayrshire	14/8/33
34654	Wompini Leonie 7th	J. McEwin, Houghton	Jersey	20/8/33
31050	Cumberland Duchess	L. W. Frost, Saddleworth	"	23/6/33
31083	Havec Tulip	Mrs. C. E. Mayger, Kapunda	"	26/6/33
31126	Roseworthy Princess 37th	Agricultural College, Roseworthy	"	3/4/33
28058	Crofton Sunflower	H. and A. Bohme, Balhannah	"	7/8/33
34278	Ear Park Rose	A. P. Spehr, Mount Gambier	"	16/9/33
28096	Pella Solanum Sunshine	W. P. Eckerman, Eudunda	"	15/7/33
31074	Glen Ewin Morn's May 2nd	Jas. McEwin, Houghton	"	7/8/33
Not allotted	Eudunda Lady Damsel	W. S. McAuliffe, Eudunda	"	16/7/33
28142	Brinkworth Jewel	C. C. T. Ottens, Brinkworth	"	17/7/33
31155	Scrub View Cherry	A. B. A. Weckert, Brinkworth	"	28/7/33
34276	Willis Vale Twinkle	A. P. Spehr, Mount Gambier	"	7/9/33
31149	Morella Princella 3rd	H. R. Walsh, Mount Barker	"	25/8/33
Not allotted	Kyby Gladys	Government Farm, Kybybolite	Ayrshire	11/9/33
31158	Scrub View Melba	A. B. A. Weckert, Brinkworth	Jersey	18/9/33
31086	Oakhill Lobelia 3rd	Mrs. M. I. Dittrich, Hampden	"	2/9/33
Not allotted	Hazelbrook Trinket	J. N. Reid, Oakbank	Ayrshire	23/8/33
"	Glenowie Netherland Pauline	H. Mountstephen, Monteith	Friesian	9/5/33
31101	Hampden Jessamine	E. W. Pfitzner, Eudunda	Jersey	13/10/33
3211	Waughope Dot 4th	Dunleith Pastoral Co., Ashbourne	A.I.S.	19/8/33
31147	Morella Belle 5th	H. R. Walsh, Mount Barker	Jersey	3/10/33
Not allotted	Balaklava Griselda Violet	A. E. Middleton, Balaklava	Friesian	16/2/34
"	Kyby Blossom	Government Farm, Kybybolite	Ayrshire	10/11/33
2353	Illawarra Noble's Cinderella	Mrs. W. J. Spackman, Long Flat	A.I.S.	17/11/33
		SENIOR FOUR-YEAR-OLDS—		
Not allotted	Glenowie Netherland Mary	H. Mountstephen, Monteith	Friesian	6/9/33
5364	Kiama Bess 5th	E. & A. Nicholls, Woodville	A.I.S.	22/9/33
28129	Eudunda Rhonda's Pride	W. S. McAuliffe, Eudunda	Jersey	13/4/33
18299	Victor's Sheila of Wangara	S. N. Bott, Murray Bridge	A.I.S.	21/8/33
28162	Anemone 3rd of Morella	E. L. Goode, Narrung	Jersey	18/7/33
28147	Hampden Janet	A. Kelly, Milang	"	2/7/33
18371	Mermaid 3rd of Elderslie	Mrs. W. J. Spackman, Long Flat	A.I.S.	5/9/33
28051	Pembroke Daisy	Mrs. C. W. Ansell, Bletchley	Jersey	17/8/33
2308	Sunnybrook Primrose	J. J. Farrow, Gawler	A.I.S.	6/9/33
31143	Fernden Lady Maderia	O. H. Woodward, Port Pirie	Jersey	—/8/33
3214	Waughope Redwing 4th	Dunleith Pastoral Co., Ashbourne	A.I.S.	15/9/33
Not allotted	Sunnybrook Flirt	J. J. Farrow, Gawler	"	8/6/33
31110	Hampden Rachel	J. A. J. Pfitzner, Hampden	Jersey	23/10/33
33597	Willis Vale Briar Rose	A. P. Spehr, Mount Gambier	Jersey	5/8/33
Not allotted	Ontario Kate 2nd	T. B. Brooks, Clarendon	"	17/7/33

† Tenth tests were required for the cows marked thus :—†, but could not be obtained,

* The dates of calving of the cows marked * could not be checked, as

OFFICIAL TEST—*continued.*

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test. %	Total Butter-fat. Lbs.	Days Tested.	Sire.	Remarks.
STANDARD, 290LBS.—*continued.*						
3 7 29	6,886½	5·31	365·71	273	Makarini 2nd of Dalebank	—
3 7 7	6,769½	5·38	364·37	273	Silver Lad of Eudunda	—
3 11 0	10,246½	3·55	364·16	273	Mariner of Greyleigh	—
3 11 23	7,965	4·38	348·74	240	Loyalty of Bridge View	†
3 11 1	6,169½	5·53	341·08	273	Para Wirra Cherry's Twylish	—
3 9 28	5,509½	6·13	309·99	273	Wollongbar Hopeful	—
3 8 24	5,692½	5·33	303·42	273	Mack of Glenford	*
3 9 1	5,311½	5·66	300·55	273	Hampden Carnation's Lad	—
3 11 10	6,277½	4·75	298·20	273	Balaklava Skylee's Collegian	—
3 6 27	5,173½	5·70	294·77	273	Werribee Combination	—
3 8 22	6,312	4·51	284·60	273	Twylish of Para Wirra	—
3 8 28	6,165	4·54	279·92	240	Dalebank Milklad 12th	†
3 8 2	5,042	5·41	272·86	273	Mercedes Sweet Duke of Glen Iris	—
3 6 23	5,835	3·72	217·23	210	Merger of Melross	Withdrawn
3 8 15	4,755	3·56	169·17	90	Glenowie Beets Griselda	* Withdrawn
3 7 17	2,340	4·61	107·90	120	Boroni of Rockness	Owner ceased testing
3 6 11	1,320	5·05	66·66	90	Boroni of Rockness	* Owner ceased testing
BUTTERFAT STANDARD, 310LBS.						
4 5 4	17,688	3·97	703·03	273	Viscount of East View	—
4 3 20	16,015½	3·41	546·66	273	Marvellous of Hill View	—
4 4 0	15,191	3·18	483·21	273	Rosevale King Sylvia Posch	—
4 0 26	10,441	4·37	455·92	273	Gowrie Park Dairyman	—
4 1 10	7,788	5·48	427·07	273	Werribee Masterman	—
4 4 4	9,910½	4·21	417·34	273	Silver Lad of Eudunda	—
4 2 12	8,262	5·01	413·62	273	Hampden Carnation's Lad	—
4 4 3	6,582	6·17	406·31	273	King Solomon of Dalebank	—
4 5 13	8,283	4·83	399·67	273	Butter King of Pella	—
4 0 10	6,435	5·76	370·79	273	Alert of Farringdon	—
4 5 2	7,176	5·09	365·16	273	Melford's Butter Lad of Pella	—
4 0 3	7,026	5·10	358·05	273	Brucevale Lord Fancy Starbright	—
4 4 8	6,606	5·39	356·38	273	Myrtle Bank Kate's Chief	—
4 0 14	6,709½	5·20	348·96	273	General Chris of Penrhyn	* —
4 0 11	5,700	5·89	335·75	240	Holly's King of Hampden	†
4 1 0	7,751½	4·30	333·01	273	Camellia's King of Willis Vale	—
4 0 9	5,659	5·80	328·07	273	Anemone's Chief of Morella	—
4 1 26	7,125	4·44	316·45	240	Loyalty of Bridge View	Dry
4 3 8	5,799	5·07	294·29	273	Scrub View Twylish Lad	—
4 4 27	5,127	5·62	287·94	273	Dalebank Carnation's Lad	—
4 4 0	6,444½	4·25	273·77	273	Oakbank Chiming Bell	*
4 4 5	8,163	3·22	263·11	273	Longbeach Netherland King 2nd	—
4 3 28	4,365	5·78	252·26	210	Maid's Success of Linden	Dry
4 4 10	5,055	3·89	196·88	240	Sinbad of Waughope	Withdrawn
4 5 11	4,080	4·63	188·75	240	Morella Anemone's Chief	†
4 3 17	5,545	2·97	164·54	120	Glenowie Beets Griselda	Withdrawn
4 0 23	2,895	4·25	123·23	210	Loyalty of Bridge View	Dry
4 1 8	2,835	3·83	108·45	90	Noble of Illawarra	Withdrawn
BUTTERFAT STANDARD, 330LBS.						
4 11 2	19,128	3·32	635·91	273	Longbeach Netherland King 2nd	—
4 10 14	13,032	3·96	516·16	273	Viscount of East View	—
4 6 24	8,122½	5·90	479·44	273	Myrtle Bank Kate's Chief	—
4 11 16	11,977½	3·61	432·50	273	Victor of Darbalara	*
4 11 11	8,169½	4·95	404·32	273	Molly 5th's Audrey Twylish of Banyule	—
4 10 17	7,036½	5·44	382·70	273	Beauty's King of Sommerville	—
4 8 15	8,815½	3·96	348·87	273	Marvellous of Hill View	—
4 11 16	5,425½	6·24	338·66	273	Twylish of Para Wirra	—
4 9 7	8,568	3·93	337·11	273	Jellicoe's Belmont of Illawarra	—
4 10 0	6,629½	5·04	334·26	273	Werribee Combination	—
4 6 27	8,697	3·64	316·24	273	Garnet of Brush Grove	—
4 10 28	7,122	4·44	316·21	273	Illawarra Jellicoe's Belmont	—
4 6 26	5,730	5·26	301·46	240	Hampden Olive's King	Sold
4 11 5	5,550	5·21	289·25	240	Camellia's King of Willis Vale	†
4 10 9	6,039	4·76	287·63	273	Cherry's Twylish of Para Wirra	—

therefore the cows concerned have been credited with only 240 days production.

calving dates had not been supplied to the Herd Book Societies concerned.

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			SENIOR FOUR-YEAR-OLD—	
31034	Para Wirra Miss Millie 2nd	J. H. Dawkins, Gawler	Jersey	17/10/33
31142	Fernden Lady Columbine	E. O. Traeger, Eudunda	"	14/8/33
Not allotted	Northfield Blossom 2nd	Insp.-General Hospitals, Northfield	A.I.S.	7/9/33
"	Hazelbrook Elva	J. N. Reid, Oakbank	Ayrshire	12/8/33
31084	Oakhill Carnation 5th	Mrs. M. I. Dittrich, Hampden	Jersey	14/9/33
28116	Burnlea Wattle 2nd	J. M. Hudd, Bletchley	"	19/6/33
18366	Muirhead's Princess of Northfield	Insp.-General Hospitals, Northfield	A.I.S.	22/9/33
28059	Myrtle Bank Maglona 2nd	H. & A. Bohme, Balhannah	Jersey	30/4/33
			MATURE COWS	BUTTERFATS
1919	Murray Glen Sylvia Patch	C. J. Morris, Monteith	Freisian	26/8/33
17875	Flower of Toora	S. N. Bott, Murray Bridge	A.I.S.	24/5/33
2502	Murray Glen Griselda's Patch	C. J. Morris, Monteith	Freisian	30/4/33
3657	Murray Glen Sylvia Topsy	C. J. Morris, Monteith	"	11/7/33
2500	Murray Glen Echo Topsy	C. J. Morris, Monteith	"	21/8/33
2194	Glenowie Griselda Posch	H. Mountstephen, Monteith	"	23/7/33
34326	Melvin Duchess	C. E. Verco, Mount Compass	Jersey	16/9/33
28161	Pella Solanum Micaelo	C. E. Verco, Mount Compass	"	13/9/33
20738	Lupin of Tuela	E. W. Pfitzner, Eudunda	"	4/8/33
28066	Tuela Drosera	F. Coleman, Saddleworth	"	12/9/33
28065	Tuela Daffodil 2nd	F. Coleman, Saddleworth	"	31/7/33
10951	Bess of Kiama	E. and A. Nicholls, Woodville	A.I.S.	9/4/33
24853	Hampden Maybee	J. A. J. Pfitzner, Hampden	Jersey	16/4/33
25051	Roseworthy Erudite 2nd	Agricultural College, Roseworthy	"	17/5/33
20752	Millie 28th of Willow Farm	A. B. A. Weckert, Brinkworth	"	20/5/33
3347	Anama Alcartra Joan	W. Hawker, Clare	Friesian	17/9/33
20847	Roseworthy Flora	Agricultural College, Roseworthy	Jersey	30/8/33
20830	Winnie of Hampden	J. A. J. Pfitzner, Hampden	"	2/5/33
28138	Dalebank Sweetbread	W. A. Mueller, Ambleside	"	18/7/33
23622	Roseworthy Princess 26th	Agricultural College, Roseworthy	"	4/5/33
23554	Myrtle Bank Kate	T. B. Brooks, Clarendon	"	4/6/33
3481	Glenowie Sylvia Patch	H. Mountstephen, Monteith	Freisian	18/7/33
28076	Tuela Sparaxis	F. Coleman, Saddleworth	Jersey	17/9/33
28166	Morella Lilly	Mrs. D. G. Steven, Kooringa	"	29/6/33
12843	Mariposa of Hampden	J. A. J. Pfitzner, Hampden	"	17/8/33
3160	Murray Glen Princess Royal	C. J. Morris, Monteith	Freisian	26/9/33
3477	Glenowie Plus Griselda 2nd	A. E. Middleton, Balaklava	"	30/7/33
23682	Pella Lady Lotus	A. Kelly, Milang	Jersey	12/6/33
23605	Hampden Rhonda	C. C. T. Ottens, Brinkworth	"	16/5/33
24858	Wooroora Starbright's Doris	A. B. Sieber, Eudunda	"	13/4/33
2461	Glenowie Pauline Griselda	H. Mountstephen, Monteith	Friesian	16/5/33
24865	Scrub View Daffodil	A. B. A. Weckert, Brinkworth	Jersey	7/6/33
24962	Pella Rose Marie	C. E. Verco, Mount Compass	"	8/7/33
14307	Lucy Grey of Pella	P. O. Schutz, Eudunda	"	16/7/33
20760	Doreen of Pella	A. B. Sieber, Eudunda	"	12/7/33
23617	Roseworthy Dawn	Agricultural College, Roseworthy	"	16/5/33
2333	Mayflower 6th of Kiama	E. & A. Nicholls, Woodville	A.I.S.	2/8/33
31119	Wompini Shy Girl	J. Francis & Son, Bugle Ranges	Jersey	10/8/33
14704	Kyby Barbara	Government Farm, Kybybolite	Ayrshire	11/7/33
18348	Cinderella 16th of Greyleigh	Mrs. W. J. Spackman, Long Flat	A.I.S.	8/9/33
3479	Glenowie Princess Patch	H. Mountstephen, Monteith	Friesian	20/7/33
20849	Roseworthy Princess 21st	Agricultural College, Roseworthy	Jersey	16/8/33
23621	Roseworthy Princess 25th	Agricultural College, Roseworthy	"	31/5/33
28060	Ontario Firefly	T. B. Brooks, Clarendon	"	13/7/33
10883	Bell 6th of Tabbagong	J. M. Irwin, Mount Barker	A.I.S.	4/6/33
20825	Judith of Talunga	C. C. T. Ottens, Brinkworth	Jersey	28/7/33
13416	Topaz of Kybybolite	Government Farm, Kybybolite	Ayrshire	17/4/33
28052	Pembroke Duchess 2nd	Mrs. C. W. Ansell, Bletchley	Jersey	24/8/33
25058	Roseworthy Sunrise	Agricultural College, Roseworthy	"	12/6/33
23619	Roseworthy Lady 2nd	Agricultural College, Roseworthy	"	24/4/33
17896	Dora of Pella	A. Kelly, Milang	"	15/8/33
23629	Roseworthy Sunbeam	Agricultural College, Roseworthy	"	16/4/33
16810	Audrey of Dalebank	L. W. Frost, Saddleworth	"	12/8/33
31020	Ontario Millie	T. B. Brooks, Clarendon	"	14/8/33
24972	Cumberland Princess	L. W. Frost, Saddleworth	"	24/8/33
18422	Kyby Heather	Government Farm, Kybybolite	Ayrshire	6/8/33
18741	Oakbank Hopeful	J. N. Reid, Oakbank	"	31/8/33
21831	Kyby Barbara 2nd	Government Farm, Kybybolite	"	1/7/33
20755	Millie 30th of Willow Farm	T. B. Brooks, Clarendon	Jersey	30/7/33
24965	Pella Sweet Lotus	W. P. Eckermann, Eudunda	"	2/4/33
24991	Brinkworth Ruby	C. C. T. Ottens, Brinkworth	"	20/5/33
23628	Roseworthy Roseal	Agricultural College, Roseworthy	"	21/4/33

† Tenth tests were required for the cows marked thus :—†, but could not be obtained

* The dates of calving of the cows marked * could not be checked, as

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 330LBS—*continued.*						
4 8 2	5,130	5·48	281·36	240	Molly 5th's Audrey Twylish of Banyule	†
4 9 13	4,845	5·71	276·44	240	Kate's Chief of Myrtle Bank	†
4 10 8	6,646½	3·89	258·70	273	Muirhead of Ben Lomond	—
4 9 0	6,373½	3·97	252·73	273	Oakbank Spotlight	*
4 7 11	5,355	4·70	251·61	210	Dalebank Carnation's Lad...........	* Sold
4 9 25	4,335	5·57	241·39	240	Mack of Glenford	Withdrawn
4 8 20	5,536½	3·75	207·89	273	Muirhead of Ben Lomond	*
4 7 27	3,568½	5·60	200·02	273	Annette's Chief of Linden	—
TANDARD 350LBS.						
9 3 17	18,558	3·66	680·79	273	Burnbank Sylvia Patch	—
6 5 9	15,720½	4·28	673·22	273	Lester of Darbalara	—
7 1 13	{ 16.209	4·15	672·68	273	} River Glen Lord Echo Griselda	—
	20,342½	4·22	857·52	365		
5 1 28	20,742	3·18	660·28	273	River Glen Lord Echo Griselda	—
7 1 17	17,982	3·57	642·66	273	River Glen Lord Echo Griselda	—
8 8 10	20,277	2·98	605·25	273	River Glen Sir Pietje Griselda	*
5 11 3	11,469	5·14	589·25	273	Retjord Julian	—
7 5 5	9,209	6·33	582·86	273	Werribee Starbright's Fancy..........	—
9 0 12	9,543	6·08	580·29	273	Maid's Success of Linden	—
5 4 27	8,877	6·24	554·02	273	Maid's Success of Linden	—
6 0 4	7,845	6·69	525·06	273	Maid's Success of Linden	—
8 8 21	{ 13,266	3·93	522·00	273	} Pembroke of Greyleigh	—
	17,142½	3·94	675 67	365		
6 10 6	8,391	6·15	516·49	273	Carnation's Lad of Dalebank	—
5 1 25	8,062½	5·98	481·75	273	King Solomon of Dalebank	—
8 8 18	9,253½	5·19	480·29	273	Molly 5th's Audrey Twylish of Banyule	—
5 10 13	14,493	3·28	475·42	273	Bloomfield Alcartra Clothilde	—
7 10 20	8,122½	5·83	473·62	273	King Solomon of Dalebank	—
7 2 4	7,209	6·57	473·35	273	Beauty's King of Somerville	—
5 9 2	9,943½	4·75	472·14	273	Mercedes Sweet Duke of Glen Iris ...	—
6 5 16	8,023½	5·88	471·77	273	Courtier of Dalebank	—
7 8 14	8,953½	5·27	471·65	273	Cheverell of Banyule	—
6 8 27	12,051	3·87	466·46	273	River Glen Sir Pietje Griselda	* —
5 1 1	8,919	5·18	461·96	273	Baron of Dalebank	—
5 3 27	8,217	5·61	460·67	273	Springmead General	—
11 4 5	7,735½	5·80	448·44	273	Retford Oaklands	—
6 11 28	12,044	3·69	443·90	273	River Glen Lord Echo Griselda	—
5 3 0	12,808½	3·42	438·28	273	River Glen Sir Pietje Griselda	—
6 2 29	6,441	6·68	430 22	273	Werribee Starbright's Fancy..........	—
6 11 12	8,280	5·08	420·63	273	Carnation's Lad of Dalebank	—
5 9 6	7,366½	5·68	418·30	273	Werribee Starbright's Fancy..........	—
7 2 12	9,274½	4·44	411·39	273	River Glen Sir Pietje Griselda	—
5 9 8	7,300½	5·59	411·27	273	Holly's King of Hampden	—
5 5 18	8,221½	4·99	410·51	273	Melford's Butter Lad of Pella	*
10 5 13	7,530	5·33	401·03	273	Werribee Starbright's Fancy..........	—
7 0 18	7,803	5·13	400·56	273	Governor Grey of Pella	—
6 4 9	7,416	5·35	396·81	273	Lad of Linden	—
5 3 23	10,032	3·95	396·34	273	Viscount of East View	*
5 8 29	7,150½	5·49	392·28	273	Werribee Masterman	—
7 8 13	9,739½	4·01	390·79	273	Loyalty of Bridge View	*
5 9 12	11,435½	3·36	384·95	273	Alma's Jellicoe of Hillcrest	*
6 2 10	11,715	3·28	384·72	240	Murray Glen Echo Griselda..........	* Dry
7 8 22	7,479	5·14	384·69	273	King Solomon of Dalebank	—
6 7 5	8,010	4·80	384·39	273	King Solomon of Dalebank	*
5 0 6	7,669½	4·99	382·75	273	Mercedes Sweet Duke of Glen Iris ...	—
7 8 3	11,961	3·18	380·41	273	Violet's Emperor of Hill View	—
8 8 26	8,292½	4·58	379·70	273	Molar Chief of Banyule	—
8 10 1	9,006	4·21	379·14	273	Loyalty of Bridge View	—
5 3 14	7,729½	4·87	376·52	273	Twylish of Para Wirra	—
5 5 3	6,256½	5·98	373·85	273	Courtier of Dalebank	—
6 7 29	7,680	4·85	372·78	273	Courtier of Dalebank	*
9 3 9	6,685½	5·57	372·24	273	Werribee Starbright's Fancy..........	—
6 7 29	7,266	5·05	367·23	273	Courtier of Dalebank	—
9 7 20	7,470	4·71	351·71	273	Twylish of Dalebank	—
6 0 24	6,232½	5·62	350·25	273	Molly 5th's Audrey Twylish of Banyule	—
5 5 15	6,999	5·00	349·93	273	King Chris of Penrhyn	—
6 1 1	8,580	4·04	346·99	240	Loyalty of Bridge View	* Dry
6 8 21	8,106	4·14	335·99	273	Aerial of Oakbank	*
5 4 4	8,713½	3·85	335·06	273	Ida's Laird of Gowrie Park	—
7 11 26	7,027½	4·76	334·86	273	Molly 5th's Audrey Twylish of Banyule	—
5 3 0	6,301½	5·28	333·07	273	Melford's King of Pella	—
5 0 3	6,586½	5·04	331·92	273	Beauty's King of Somerville	—
6 4 29	5,674½	5·76	326·97	273	Courtier of Dalebank	—

therefore the cows concerned have been credited with only 240 days production.
calving dates had not been supplied to the Herd Book Societies concerned.

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			MATURE COWS—BUTTERFAT STANDARD	
18368	Princess of Northfield	I.G.H., Northfield	A.I.S.	31/3/33
10993	Kyby Aurea	Government Farm, Kybybolite	Ayrshire	1/10/33
Not allotted	Glenowie Echo Patch	H. Mountstephen, Monteith	Friesian	4/5/33
34601	Palpara Connie	Mrs. C. E. Mayger, Kapunda	Jersey	7/8/33
17889	Jean 3rd of Dalebank	Mrs. C. W. Ansell, Bletchley	"	30/6/33
16806	Solanum's Blossom of Pella	W. P. Eckermann, Eudunda	"	21/5/33
31091	Glandore Lady	J. J. O'Sullivan, Tarlee	"	15/9/33
21836	Kyby Madge 2nd	Government Farm, Kybybolite	Ayrshire	22/8/33
28164	Morella Belle 4th	H. R. Walsh, Mount Barker	Jersey	21/8/33
28062	Ontario Kate's Twylish	T. B. Brooks, Clarendon	"	2/5/33
23567	Willow Farm Millie 31st	A. J. Marrett, Saddleworth	"	31/7/33
18327	Mayflower 5th of Kiama	E. and A. Nicholls, Woodville	A.I.S.	30/9/33
13105	Millie 10th of Melross	Dunleith Pastoral Co., Ashbourne	"	26/8/33
13104	Gentle 9th of Melross	Dunleith Pastoral Co., Ashbourne	"	8/8/33
1543	Glenlea Dixie	E. T. Vinall, Brighton	Guernsey	21/9/33
21843	Kyby Winsome	Government Farm, Kybybolite	Ayrshire	23/9/33
17883	Pembroke Viola	Mrs. C. W. Ansell, Bletchley	Jersey	10/9/33
18369	Royal Sunflower of Northfield	I.G.H., Northfield	A.I.S.	7/9/33
21839	Kyby Rose 4th	Government Farm, Kybybolite	Ayrshire	18/9/33
13107	Melba 5th of Melross	Dunleith Pastoral Co., Ashbourne	A.I.S.	5/9/33
24837	Burnlea Gloria	J. M. Hudd, Bletchley	Jersey	—/6/33
24989	Oakhill Carnation 4th	Mrs. M. I. Dittrich, Hampden	"	3/8/33
28146	Hill Farm Bellona 2nd	E. W. Pfitzner, Eudunda	"	15/10/33
24994	Hampden Dorothy	A. E. Middleton, Balaklava	"	8/10/33
18310	Searchlight's Hayliss of Wangara	E. A. Groth, Walker's Flat	A.I.S.	1/12/33
20221	Gowrie Park Lolette	J. N. Reid, Oakbank	Ayrshire	11/8/33
28187	Balaklava Skylee's Colleen	A. E. Middleton, Balaklava	Jersey	—/10/33
23638	Kelvinside Trilby Olive	H. R. Walsh, Mount Barker	"	29/8/33
15184	Oakbank Alleyne	Government Farm, Kybybolite	Ayrshire	16/10/33
13415	Kyby Rose 2nd	Government Farm, Kybybolite	"	18/9/33
17517	Cherlton Sparkle	R. J. Laing, Gumeracha	Jersey	1/11/33
14662	Somerset's Model of Wangara	H. B. Kuchel, Murray Bridge	A.I.S.	4/4/33
23591	Woodside Morn	J. McEwin, Houghton	Jersey	30/10/33
17877	Jewel of Toora	H. B. Kuchel, Murray Bridge	A.I.S.	30/10/33
15050	Brenda Park Violet	S. N. Bott, Murray Bridge	"	28/10/33
14973	Kingston's Bloom 2nd of Wangara	E. A.Groth, Walker's Flat	"	-/1/34
3478	Glenowie Plus Triumph	H. Mountstephen, Monteith	Friesian	26/11/33
23569	Pella Butter Queen	W. P. Eckermann, Eudunda	Jersey	14/11/33
18693	Oakbank Aim	Government Farm, Kybybolite	Ayrshire	13/12/33
28112	Burnlea Glory 2nd	J. M. Hudd, Bletchley	Jersey	9/4/34
		Cows completed 365 days Official Test.	Figures for 273 days.	
17885	Ruby of Toora	S. N. Bott, Murray Bridge	A.I.S.	23/3/33
Not allotted	Ninyeri Mayflower	E. L. Goode, Narrung	Jersey	4/3/33

BUTTERFAT TESTS (OFFICIAL) FOR HALF-YEAR ENDED JUNE 30TH, 1934, OF PURE AND OF FOUNDATION

Particulars of Registration.	Name of Cow.	Owner and Address.	Breed.	Calved.
			JUNIOR TWO-YEAR-OLDS—	
App. C.	Strathearn Rose Marie	E. A. Groth, Walker's Flat	A.I.S.	13/4/33
C.R. ..	Roseworthy Princess 49th	Agricultural College, Roseworthy	Jersey	6/6/33
C.R. ..	Balaklava Collegians Gentle	A. E. Middleton, Balaklava	"	22/7/33
C.R. ..	Kyby Justice	Government Farm, Kybybolite	Ayrshire	16/10/33
			SENIOR TWO-YEAR-OLDS—	
App. C.	Strathearn Rhonda	E. A. Groth, Walker's Flat	A.I.S.	11/6/33
App. C.	Strathearn Margaret	E. A. Groth, Walker's Flat	A.I.S.	5/11/33
			JUNIOR THREE-YEAR-OLDS—	
App. B.	Mt. Annan Roany 2nd	J. M. Irwin, Mount Barker	A.I.S.	14/11/33
			SENIOR FOUR-YEAR-OLD—	
App. C.	Strathearn Viola	E. A. Groth, Walker's Flat	A.I.S.	24/9/33
			MATURE COWS BUTTERFAT—	
App. D.	Gayflower of Strathearn	E. A. Groth, Walker's Flat	A.I.S.	1/7/33

† Tenth tests were required for the cows marked thus :—†, but could not be obtained,

* The dates of calving of the cows marked * could not be checked. as

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
STANDARD, 350LBS.—*continued.*						
5 6 25	7,635	4·26	324·95	273	Conjuror of Darbalara	—
10 9 9	7,425	4·30	319·26	240	Anthony of Glenelra	†
6 6 13	9,418½	3·31	311·45	273	River Glen Sir Pietje Griselda	*
6 1 13	5,892	5·26	309·64	273	Trojan of Dalebank	—
8 7 4	7,036½	4·29	302·23	273	Baxter of Banyule	—
9 2 10	5,850	5·15	301·13	273	Werribee Starbright's Fancy	—
5 1 22	5,623½	5·15	289·88	273	You'll Do of Dalebank	—
5 2 7	7,305	3·94	287·54	240	Loyalty of Bridge View	*†
5 1 20	6,084	4·72	286·89	273	Mercedes Sweet Duke of Glen Iris	—
5 8 24	5·703	5·01	285·50	273	Cherry's Twylish of Para Wirra	—
7 0 18	5,787	4·98	284·88	273	Molly 5th's Audrey Twylish of Banyule	—
5 9 8	7,560	3·71	280·63	240	Viscount of East View	Withdrawn
5 7 12	7,683	3·62	277·87	273	Dainty's Triumph of Melross	—
5 8 0	7,935	3·48	276·38	240	Dainty's Triumph of Melross	†
7 2 12	5,515½	4·89	269·59	273	Minnamuna Laddie	—
5 5 16	7,260	3·69	267·61	240	Loyalty of Bridge View	†
8 10 1	4,752	5·62	267·15	273	Twylish of Dalebank	—
5 4 11	7,527	3·47	261·00	273	Royal's Success of Arrawatta	*
5 4 12	6,414	4·00	256 29	273	Loyalty of Bridge View	*
5 4 24	7,350	3·36	247·17	240	Merger of Melross	Withdrawn
6 1 0	4,777½	5·12	244·65	240	Mack of Glenford	Withdrawn
5 3 28	4,849½	5·02	243·57	273	Milklad II. of Dalebank	—
7 9 5	4,605	5·27	242·74	180	Oliver of Hampden	Sold
5 7 11	4,605	5·16	237·70	150	Beauty's King of Somerville	* Withdrawn
5 1 2	5,475	4·30	235·39	180	Searchlight of Darbalara	Withdrawn
6 0 13	6,765	3·43	232·30	273	Loyal Scot of Gowrie Park	*
7 1 0	4,665	4·91	228·82	150	Balaklava Skylee Collegian	Withdrawn
7 7 20	4,815	4·75	228·56	240	Noble of Yaralla	†
6 10 9	5,340	4·11	219·35	240	Bright's Jock of Oakbank	Dry
9 4 5	5,235	4·10	214·66	240	Loyalty of Bridge View	Withdrawn
9 3 0	4,380	4·64	203·04	210	Duke of Dalebank	Withdrawn
11 2 7	5,461½	3·65	199·64	273	Somerset of Darbalara	—
8 0 12	3,712½	4·45	165·15	90	Montrose Sultan	Withdrawn
9 2 6	4,860	3·24	157·53	90	Iris 5th's Superb of Toora	Sold
9 4 25	3,435	3·56	122·31	90	Somerset of Darbalara	Exemption
7 11 0	2,175	4·15	90·34	60	Kingston of Sunny Vale	Withdrawn
6 11 25	1,725	4·33	74·70	30	River Glen Sir Pietje Griselda	* Dead
6 6 19	1,425	3·21	45·69	60	Werribee Starbright's Fancy	Withdrawn
8 2 23	840	4·31	36·20	30	Summit of Lady Bank	Exemption
5 7 7	600	5·24	31·44	30	Mack of Glenford	Owner ceased testing
published in previous list for half-year ended December 31st, 1933.						
6 0 25	17,332	4·46	773·01	365	Lester of Darbalara	*
2 3 16	7,217½	4·93	355·75	365	Hampden Mayflower King	*

BREEDS WHICH, ON JUNE 30TH, WERE REGISTERED IN THE CALF ROLL ONLY, AND APPENDIX COWS.

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 230LBS.						
1 9 19	7,651½	3·93	300·99	273	Sunflower'sSearchlight 2nd of Wangara	—
1 10 6	4,718	6·09	287·20	273	Glen Iris Mercedes Sweet Duke	—
1 11 1	4,665	4·86	226·62	210	Balaklava Skylee's Collegian	Withdrawn
1 11 15	3,570	3·81	136·18	240	Kyby Roger	—
BUTTERFAT STANDARD, 250LBS.						
2 10 10	8,860½	4·31	382·00	273	Sunflower's Searchlight II. of Wangara	—
2 11 18	2,340	4·00	93·65	90	Sunflower's Searchlight II. of Wangara	Withdrawn
BUTTERFAT STANDARD, 270LBS.						
3 1 16	2,580	4·16	107·32	120	Pet's Belmont of Kiama	Withdrawn
BUTTERFAT STANDARD, 330LBS.						
4 6 10	3,465	3·79	131·18	120	Sunflower's Searchlight II. of Wangara	Withdrawn
STANDARD, 350LBS.						
5 6 11	4,950	4·60	227·52	210	Gayboy	Withdrawn

herefore the cows concerned have been credited with only 240 days production.

calving dates had not been supplied to the Herd Book Societies concerned.

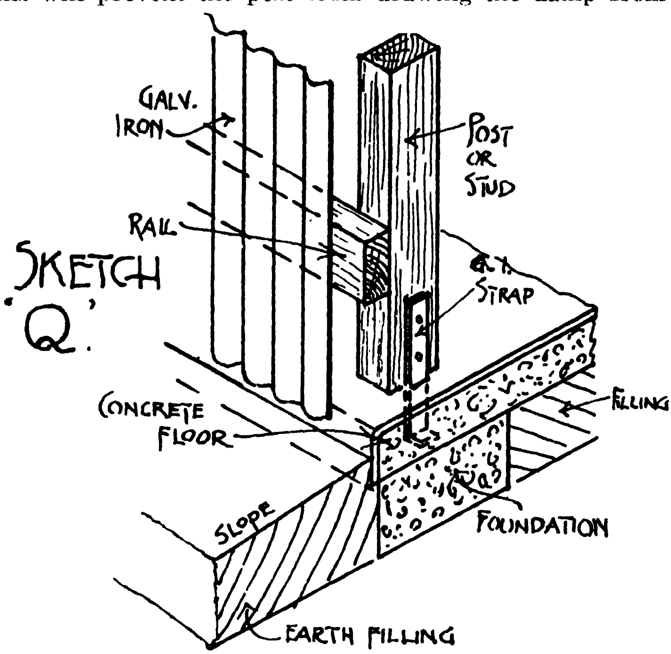
SOME NOTES IN GENERAL ON THE CONSTRUCTION OF BUILDINGS.

[By T. A. MACADAM, Dip. Arch. (Glas.), A.R.A.I.A., Lecturer in Architecture and Building, School of Mines, Adelaide.]

(Continued from July issue.)

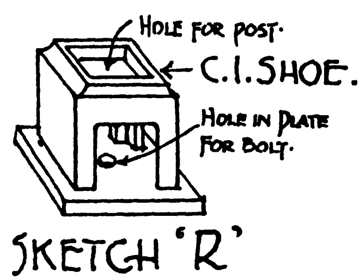
CONCRETE FLOOR.

In some wood and iron buildings it is necessary to have a concrete floor, and this varies the construction shown in the previous portion of this article. In Sketch 'Q' is shown the post or stud resting on the concrete floor and secured to same by a galvanized iron strap. The strap would be let into the concrete when the floor is laid and later secured to the stud or post with two stout screws. The foot of the post should be shod with galvanized iron or a piece of galvanized iron put between the post and the floor. This will prevent the post from drawing the damp from the floor.

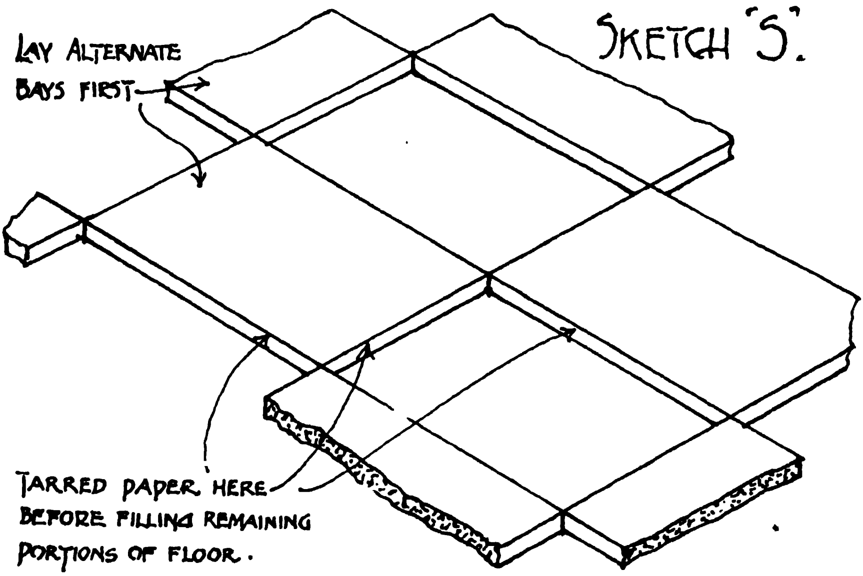


Note the position of the rail in the sketch. This rail should be kept 6in. clear of the floor for the same reason as we protect the foot of the post or studs. The position of a concrete foundation below the posts is indicated, and also the grading of the soil outside the wall to keep the foundation free of surface water.

Another method which is sometimes adopted at the foot of posts resting on concrete floors is to place a cast iron shoe on the floor to keep the post off the floor and in this way the post is kept clear of any damp which may rise from the floor and also prevents white ants attacking the post. The shoes are made from a stock pattern similar to that shown in Sketch 'R.'



While on the subject of concrete floors a reference should be made to the method of laying the floor. A good plan is to divide the area into sections about 6ft. by 3ft. or 5ft. by 4ft. Prepare each alternate section for the concrete by placing the necessary boards at the sides and ends of the sections to be filled. See that these boards are firmly supported in position, and that the soil to be covered by the concrete is firm. The concrete is then mixed and placed in each alternate section. When this



has set the boards can be removed, and in place of the boards put a layer of tarred paper on the exposed edges of the concrete which will be covered when the unfilled sections are filled. The object of the paper is to form a definite joint between the sections of the concrete and permit expansion or contraction to take place without cracking the floor. Tarred paper is suggested, but any other material may be used if it will serve the same purpose. If timber is used it should be removed before the concrete has set.

Any fall required in the floor should be carefully marked on the boards used for keeping the concrete in position. If possible the top of the boards should be set with a fall equal to that which is required on the surface of the floor.

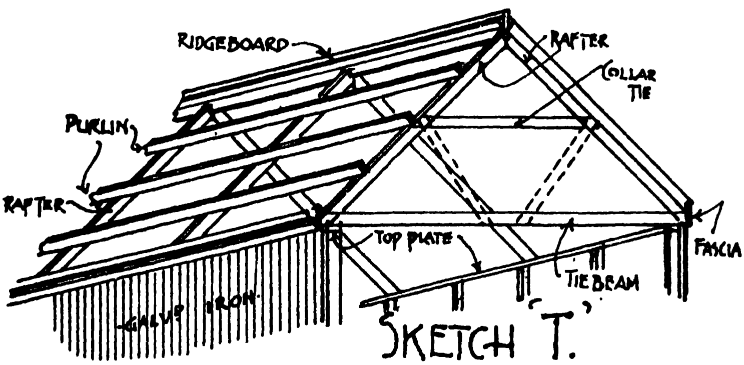
ROOF.

(See notes on roofing in first portion of article in June issue.)

To complete the wood and iron building the roof is considered next. The simplest form of roof is the gable type (see Sketch 'L' in July issue), as there is no special cutting required where the timbers join. This form is constructed with rafters and tie-beam or ceiling joists. At the top of the rafters is placed the ridgeboard, and at the bottom is the top plate

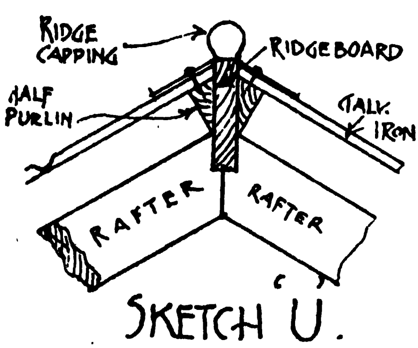
of the walling to which the rafters are nailed and strapped. The ceiling joists or tie-beams are also fixed to the top plate of the walling, and when possible are bolted to the lower end of the rafters.

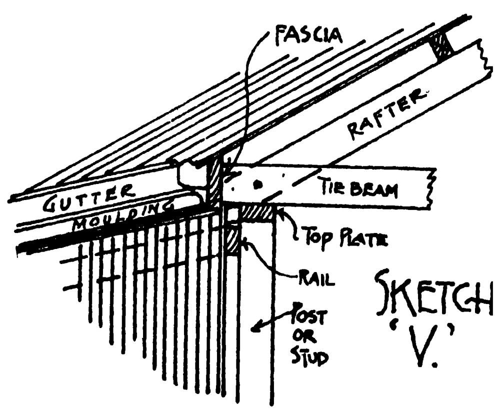
Should a stronger roof be required struts can be added as shown by dotted lines on Sketch 'T.'



The relation of the ridgeboard to the rafters is shown on Sketch 'U.'

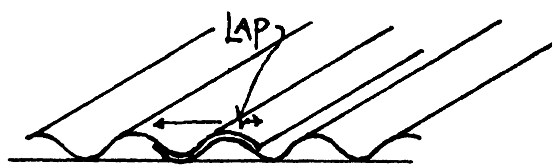
On the top of the rafters are placed the purlins to provide support for the sheets of galvanized iron. The purlins should be spaced at not more than 3ft. centres and fixed in position on the rafters to suit the size of sheets intended for roofing. Secure the purlins to the rafters with 3in.





nails. The next piece of timber to be fixed is the fascia. This is placed at the foot of the rafters in position shown in Sketch 'V' and projecting above the rafter the depth of the purlin. When the galvanized iron sheets are placed on the roof they are secured to the purlins and to the fascia, hence the reason for the fascia having the same relation to the rafter as the purlin.

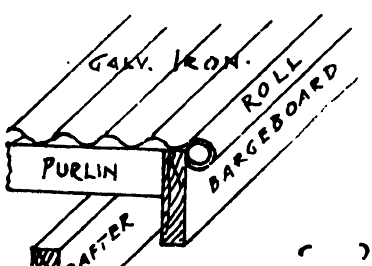
Gutters are next placed in position on the fascias and fixed to them with straps or brackets. Below the gutter is fixed a small moulding for additional support to the gutter. See that the gutter is fixed with a fall to the outlet or down pipe. The sheets of iron are then fixed in position on the roof, overlapping the fascia 1in. When placing the sheets on the roof reverse each alternate sheet and lap over the adjoining sheet on each side one and a half flutes. See Sketch 'W.' At the top and bottom of the sheets the lap should be 6in. A sheet of iron covers approximately 1ft. 11in. wide by 6in. less than its length.



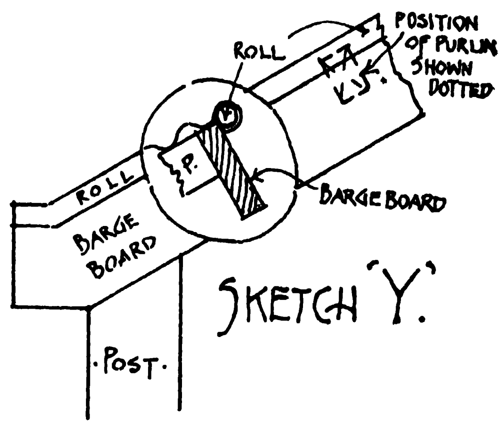
SKETCH 'W.'

SHOWING TWO SHEETS OF IRON LAPPED AT SIDE.

At the gable ends the simplest finish is obtained by placing a fascia or bargeboard on the end of the purlins and running parallel with the rafters



SKETCH 'X'



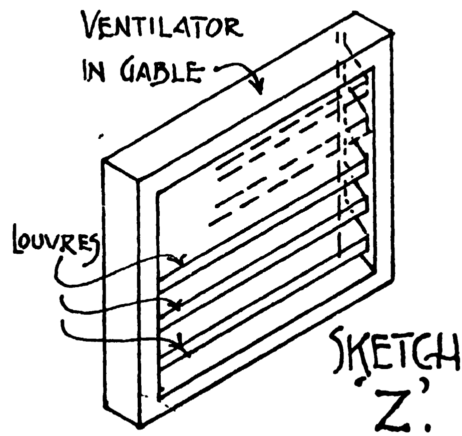
SKETCH 'Y.'

as shown in Sketch 'X.' On the side of the bargeboard fix a 1½in. galvanized iron downpipe at the top of the board and carry the edge of the roofing iron over it as shown in Sketch 'Y.' This will avoid any woodwork being exposed on the roof as mentioned under "Painting," in the June issue.

It will be noticed that the ridgeboard is kept sufficiently high to allow the galvanized iron sheets to butt against it on each side. To enable the galvanized iron sheets to get a fixing at the ridge a purlin is cut diagonally in two, and a half placed on each side of the ridgeboard as shown in Sketch 'U.' When all the sheets are fixed in position a galvanized iron ridge capping is fixed on the top and nailed or screwed to the half purlins.

VENTILATION IN GABLES.

With the gable type of roof, ventilation of the air space under the iron is obtained by placing a louvre vent in each gable. The louvre vent is constructed with galvanized iron louvres placed in a wooden frame which is grooved to receive them. See Sketch 'Z,' which shows the frame with two louvres in position. Note that the louvres are turned down at the bottom or outer edge and up at the top or inner edge. The slope of the louvres should not be less than 45 degrees, and in exposed situations should be 60 degrees. The louvres may be placed 2in. apart and galvanized wire netting should be fixed on the inside of the frame to keep out birds. The louvres should not be longer than 18in. without a centre support. The wood frame could be made out of 3in. x 2in. material with a 3in. x 3in. weathered jarrah sill, and placed between the studs which support the material covering the gable. Put a vent in each gable to ensure through ventilation.



(Concluded.)

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during June.	Milk. Per Cow during June.	Milk. Per Cow December to June.	Butterfat. Per Herd during June.	Butterfat. Per Cow during June.	Butterfat. Per Cow December to June.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	19	13·97	10,014½	527·08	2,742·66	457·19	24·06	137·25	4·56
6/C ..	21·87	10·80	5,039	230·40	3,024·81	223·74	10·23	129·98	4·44
6/H .	23·03	16·03	10,321	448·15	2,579·69	434·76	18·88	129·57	4·21
6/Y ..	15	9·93	2,526	168·40	2,816·41	124·52	8·30	125·68	4·93
6/Ii ..	22	19·20	10,212	464·18	4,741·47	433·40	19·70	203·74	4·24
6/Ll .	26	18·13	10,536	405·23	3,447·43	377·14	14·51	181·77	3·58
6/Oo .	17·97	11·77	7,106¼	395·46	4,224·94	323·03	17·98	196·92	4·55
6/Pp .	15	11·43	5,727½	381·83	3,602·40	308·30	20·55	182·71	5·38
6/Rr	27·57	19·90	11,139	404·03	5,056·56	494·19	17·92	212·22	4·44
6/Tt .	19·97	17·43	10,554	528·49	4,704·10	465·49	23·31	209·68	4·41
6/Xx	24	16·70	7,542	314·25	4,010·95	308·90	12·87	176·50	4·10
6/Zz..	27	23·03	11,062	409·70	3,974·99	518·71	19·21	190·08	4·69
6/Bbb	25	14·30	9,613	384·52	4,121·48	419·92	16·80	184·69	4·37
6/Ccc	21	14·23	6,885	327·86	3,395·77	278·64	13·27	148·62	4·05
6/Ddd	22·07	18·80	10,222	463·16	4,364·89	390·20	17·68	182·50	3·82
6/Eee	28	18·37	15,258	544·93	4,796·97	620·84	22·17	198·65	4·07
6/Fff	23·37	19·87	10,899½	466·38	4,774·21	456·62	19·54	202·05	4·19
6/Ggg	24·73	18	11,278	456·04	5,039·50	378·20	15·29	190·45	3·35
7/Hhh	17	10·90	5,586	328·59	3,699·96	249·95	14·70	175·65	4·47
6/Iii .	25	23·97	12,720½	508·82	5,105·04	558·52	22·34	214·36	4·39
6/Jjj	25	18·37	11,895	475·80	3,825·59	542·00	21·68	183·56	4·56
6/Kkk	38	35·03	22,347	588·08	4,980·55	942·27	24·80	196·50	4·22
6/Lll	21·87	16·53	9,244	422·68	3,470·45	447·06	20·44	163·27	4·84
6/Mmm	9·37	6·90	7,080	755·60	May-June 1,404·56	257·95	27·53	May-June 50·16	3·64
Means	22·45	16·82	9,783·65	435·78	4,108·23	417·15	18·58	178·81	4·26

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during June.	Milk. Per Cow during June.	Milk. Per Cow July to June.	Butterfat. Per Herd during June.	Butterfat. Per Cow during June.	Butterfat. Per Cow July to June.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	31	25	12,885	415·64	5,758·37	509·50	16·44	226·35	3·95
7/H .	7	6·83	2,832½	404·64	6,222·15	141·10	20·16	293·93	4·98
7/L ..	34·60	24·10	11,110½	321·11	5,770·54	533·50	15·42	267·18	4·80
7/P ..	28	20·10	13,409½	478·91	6,632·12	668·24	23·87	316·04	4·98
7/T ..	16	6	2,070	129·37	4,144·00	96·60	6·04	181·74	4·67
7/Y ..	28	19	6,270	223·93	5,116·59	267·37	9·55	222·41	4·26
7/Aa .	12	8·47	2,860	238·33	4,987·91	120·78	10·07	217·87	4·22
7/Kk	23	15·47	10,499	456·48	7,701·11	428·46	18·63	316·54	4·08
7/Mm	39	20·07	8,798	225·59	6,112·03	317·79	8·15	231·53	3·61
7/Pp .	18	11·30	6,406½	355·92	6,264·45	309·77	17·21	316·41	4·88
7/Tt .	17·70	14·93	9,494	536·38	6,905·98	421·87	23·83	280·10	4·44
7/Uu	22·57	19·43	12,217	541 52	4,851·49	524·12	23·23	219·28	4·27
7/Vv .	20	14·03	8,302½	415·13	7,504·01	367·33	18·37	338·77	4·42
7/Xx	20·67	17	10,896	530·09	7,472·48	583·74	28·38	393·66	5·40
7/Yy	25	17·83	4,867½	194·70	3,646·76	227·93	9·12	162·20	4·68
7/Bbb	71·23	46·80	24,444½	343·18	5,668·48	1,091·89	15·33	256·67	4·47
7/Ccc.	23·80	16·17	6,985½	293 51	5,603·42	290·70	12·21	248·61	4·16
7/Ddd	13	9·27	4,777	367·46	6,103·66	226·65	17·43	288·71	4·74
7/Eee	11	9·87	7,046	640 54	5,495·56	372·30	33·85	271·47	5·28
7/Fff	19	17	7,245	381·32	Oct.-June 4,006·49	331·20	17·43	Oct.-June 181·17	4·57
7/Ggg	16·97	7·03	3,172	186·92	Nov.-June 2,142·44	145·39	8 57	Nov.-June 100·72	4·58
Means	23·69	16·46	8,408·95	354·92	5,799·53	379·82	16·03	258·28	4·52

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during June.	Milk. Per Cow during June.	Milk. Per Cow October to June.	Butterfat. Per Herd during June.	Butterfat. Per Cow during June.	Butterfat. Per Cow October to June.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	36	27·80	13,466	374·06	4,112·21	673·03	18·70	208·47	5·00
5/D ..	36	23·77	13,305	369·58	3,639·03	679·67	18·88	196·42	5·11
5/E ..	36·37	25·47	12,642½	347·61	3,557·03	688·85	18·94	188·14	5·45
5/P ..	35·53	26·73	18,615½	523·93	5,462·33	981·22	27·62	263·48	5·27
5/R ..	61·07	39·60	19,701	322·59	2,998·84	836·42	13·70	127·88	4·25
5/S...	14·77	13·53	5,962	403·65	4,327·55	308·47	20·88	211·34	5·17
5/EE .	18	4·97	2,203½	122·42	3,923·92	112·06	6·23	194·16	5·08
5/GG .	14	13	4,005	286·07	3,115·78	187·20	13·37	151·88	4·67
5/KK	19	15·07	7,651	402·68	4,653·35	403·54	21·24	221·58	5·27
5/NN	18·60	12·67	6,370½	342·50	3,791·45	319·63	17·18	185·63	5·02
5/QQ .	15	9·30	4,161	277·40	3,117·59	222·41	14·83	158·64	5·34
5/RR	23	18	5,310	230·87	2,617·56	284·53	12·37	140·83	5·36
5/SS .	17	7	2,803½	164·91	2,823·43	142·02	8·35	140·87	5·06
5/TT .	12	8·10	2,998½	249·87	4,930·93	180·92	15·08	249·45	6·03
5/YY	13	8·17	3,030	233·07	3,142·35	176·44	13·57	159·64	5·82
5/WW	23	18	8,775½	381·54	3,451·03	398·98	17·35	159·20	4·55
5/XX	20	11·97	5,263	263·15	3,442·51	265·52	13·28	168·22	5·04
5/VV .	20·03	17·10	13,448	671·39	3,552·67	557·02	27·81	158·29	4·14
5/ZZ..	29	8·67	3,366	116·07	3,306·21	125·26	4·32	125·64	3·72
5/AAA	19	10·57	4,414	232·32	2,800·64	226·26	11·91	141·49	5·13
5/BBB	16	8·10	3 018	188·62	2,491·29	171·88	10·75	127·89	5·69
5/CCC	13	10	4,584	352·61	1,099·49	189·82	14·60	51·99	4·14
Means	23·15	15·35	7,504·25	324·11	3,609·68	369·60	15·96	174·92	4·93

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during June.	Milk. Per Cow during June.	Milk. Per Cow March to June.	Butterfat. Per Herd during June.	Butterfat. Per Cow during June.	Butterfat. Per Cow March to June.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	26	21·87	12,096¼	465·25	1,931·67	656·10	25·23	104·86	5·42
9/B ..	14·87	11·60	5,091	342·36	1,546·69	226·06	15·20	71·62	4·44
9/C ..	12	8·80	5,358	446·50	1,178·46	233·58	19·47	53·05	4·36
9/D ..	25·60	23·13	13,569½	530·06	2,057·40	739·27	28·88	108·09	5·45
9/E ..	13	10·50	5,400	415·38	1,836·95	268·58	20·66	85·04	4·97
9/F ..	17·33	13·20	10,992	634·27	1,330·77	447·83	25·84	55·35	4·07
9/G ..	33	22·83	9,606¼	291·11	1,517·35	582·95	17·67	82·00	6·07
9/H .	18·40	17·53	13,581	738·09	2,140·03	556·89	30·27	91·92	4·10
9/I ..	36	15·10	6,082½	168·96	707·87	261·10	7·25	29·40	4·29
9/J...	56·10	38·60	16,327½	291·04	1,044·16	758·18	13·51	46·83	4·64
9/K .	22	14·53	5,889½	244·98	1,027·07	277·75	12·63	51·55	5·15
9/L ..	26·53	15·60	9,625	362·79	1,122·69	379·86	14·32	42·88	3·95
9/M .	16	1	150	9·38	46·32	8·79	·55	2·27	5·86
9/N ..	32·67	29·03	17,578¼	538·06	1,661·50	755·36	23·12	66·64	4·30
9/O ..	21·50	11·23	5,803¼	269·93	1,086·09	288·16	13·40	51·64	4·96
9/P ..	47	32·60	15,113	321·55	996·85	704·12	14·98	46·87	4·66
					Apr.-June			Apr.-June	
9/Q ..	15	15	8,370	558·00	1,400·13	380·18	25·35	65·41	4·54
9/R ..	9	4·63	1,085	120·56	467·28	68·00	7·56	26·54	6·27
					May.-June			May.-June	
9/S...	12	8	4,275	356·25	726·96	191·46	15·96	31·73	4·48
9/T ..	10·27	9·27	5,994	583·63	1,039·33	273·76	26·66	46·67	4·57
9/U ..	15	12·07	5,378¼	358·57	795·87	287·00	19·13	43·79	5·34
9/V ..	10	10	3,720	372·00	—	190·74	19·07	—	5·13
Means	22·24	15·73	8,208·48	369·09	1,317·06	387·99	17·45	61·84	4·73

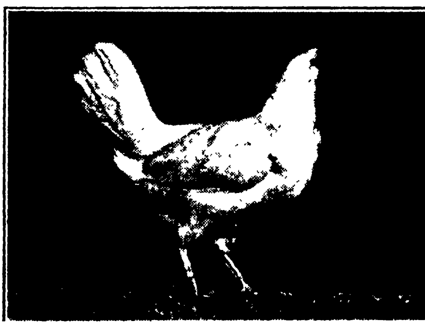
PARAFIELD EGG-LAYING COMPETITIONS, WINTER TEST.

[By C. F. ANDERSON, Poultry Expert.]

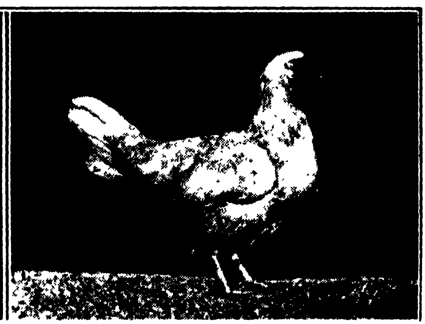
The Egg-laying Competition commenced on April 1st, 1934, and the Winter Test extended until July 31st, 1934, a period of 122 days. The competition is all Single Testing.

There were nine classes in the competition, and the following entries were received :—

SECTION 1.—WET MASH.	
Class 1.—White Leghorns	333
Class 2.—Any other light breed	15
Class 3.—Black Orpingtons	63
Class 4.—Any other heavy breed	30
SECTION 2.—DRY MASH.	
Class 5.—White Leghorns	12
Class 6.—Any other light breed (no entries received)	
Class 7.—Black Orpingtons	9
HOME PROJECT UTILITY SECTION.—WET MASH.	
White Leghorns	19
Black Orpingtons	3
Rhode Island Reds	1
Total birds competing	485



Leading bird, White Leghorn Section, owned by Mr. S. Hill, Bridgewater; score, 86 first-grade eggs.



Leading bird in the Home Project Utility Section, owned by Milton Smith, Salisbury; score, 79 first-grade eggs.

The Home Project Utility Section, in which 23 entries were received, is for scholars who are taking poultry as a home project in the State schools.

The accompanying table of scores gives the number of first grade, second grade, and total number of eggs laid from April 1st to July 31st, the period of the winter test of all birds competing.

Every egg laid throughout the currency of the test is weighed individually, and the following are the conditions governing first grade eggs :—

A first grade egg shall weigh :—

From April 1st to May 31st, a minimum weight of 1¾ozs.

From June 1st to June 30th, a minimum weight of 1⅞ozs.

From July 1st to March 31st, a minimum of 2ozs.

SCORES FROM 1st APRIL, 1934, TO 31st JULY, 1934.

Section 1.—Wet Mash.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
A. J. Hill, Sunraysia Poultry Farm, Greensborough, Victoria	1	64	2	66
	2	56	3	59
	3	23	37	60
	4	—	1	1
	5	55	10	65
	6	46	7	53
A. H. Matthews, Bridgewater	7	61	17	78
	8	68	—	68
	9	54	1	55
	10	60	1	61
	11	62	6	68
	12	40	20	60
G. W. T. Symes, Echunga	13	45	—	45
	14	27	1	28
	15	54	—	54
	16	33	—	33
	17	46	—	46
	18	53	—	53
E. B. Glidden, Yundi	19	46	—	64
	20	38	1	39
	21	*	*	*
	22	*	*	*
	23	48	13	61
	24	28	9	37
T. Cleaver, Bridgewater	25	61	2	63
	26	21	—	21
	27	55	30	85
	28	62	10	72
	29	52	—	52
	30	49	1	50
J. E. Assender, Echunga	31	39	8	47
	32	50	—	50
	33	35	—	21
	34	35	—	35
	35	47	5	52
	36	26	16	42
S. Hill, Bridgewater	37	43	1	44
	38	51	28	79
	39	86	—	86
	40	71	1	72
	41	13	1	14
	42	31	1	32
W. Restall, Echunga	43	75	—	75
	44	66	—	66
	45	48	18	66
	46	33	—	33
	47	34	1	35
	48	62	3	65
C. Guthridge, Yundi	49	49	—	49
	50	71	2	73
	51	48	3	51
	52	10	70	80
	53	40	33	73
	54	43	37	80
S. Lambert, Echunga	55	42	—	42
	56	28	—	28
	57	*	*	*
	58	28	7	35
	59	16	1	17
	60	25	10	35
A. Young, Bridgewater	61	65	15	80
	62	64	4	68
	63	24	—	24
	64	63	2	65
	65	30	—	30
	66	60	—	60
D. J. Foxwell, Echunga	67	54	—	54
	68	31	—	31
	69	56	—	56
	70	29	3	32
	71	51	—	51
	72	33	5	38
J. C. Normandale, Yundi	73	27	11	38
	74	47	—	47
	75	43	—	43
	76	65	9	74
	77	57	10	67
	78	63	14	77
L. W. Sando, Echunga	79	68	1	69
	80	36	26	62
	81	33	—	33
	82	68	13	81
	83	74	1	75
	84	19	1	20
J. O. Marshall, Yundi	85	57	1	58
	86	79	2	81
	87	48	43	91
	88	6	—	6
	89	49	1	50
	90	19	—	19
Murray Powell, Jupiter Creek	91	45	29	74
	92	56	14	70
	93	62	8	70
	94	*	*	*
	95	51	2	53
	96	35	24	59
S. Bridge, Yundi	97	64	19	83
	98	63	3	66
	99	55	6	61
	100	9	—	9
	101	*	*	*
	102	53	11	64
C. T. Rodger, Echunga	103	33	—	33
	104	26	—	26
	105	57	6	63
	106	41	—	41
	107	51	—	51
	108	26	—	26
R. H. Smith, Yundi	109	17	47	64
	110	12	74	86
	111	66	4	70
	112	13	48	61
	113	56	21	77
	114	11	70	81
Willow Bend Stud Poultry Farm, North Walkerville	115	28	25	53
	116	41	23	64
	117	58	1	59
	118	—	—	—
	119	38	20	58
	120	40	11	51
C. MacDonald, Echunga	121	12	10	22
	122	46	—	46
	123	73	—	73
	124	66	1	67
	125	46	2	48
	126	66	—	66
T. R. Smart, Yundi	127	71	5	76
	128	48	—	48
	129	68	3	71
	130	51	16	67
	131	*	*	*
	132	74	7	81

* Dead.

EGG-LAYING COMPETITIONS—*continued.*

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
Raymoor Poultry Farm, William Street, Kilkenny	133	42	16	58
	134	27	12	39
	135	44	1	45
	136	59	14	73
	137	57	2	59
	138	38	6	44
B. R. Whittington, Yundi	139	19	29	48
	140	67	17	84
	141	79	4	83
	142	20	43	63
	143	43	24	67
	144	45	4	49
W. A. Hazeal, 11, Rosetta Street, Rosewater	145	—	—	—
	146	67	1	68
	147	42	10	52
	148	30	2	32
	149	32	—	32
	150	41	—	41
H. F. Muirson, Yundi	151	31	25	56
	152	58	17	75
	153	25	6	31
	154	42	18	60
	155	69	1	70
	156	31	5	36
K. Pennack, Pooraka	157	3	44	47
	158	54	11	65
	159	52	5	57
	160	67	3	70
	161	62	6	68
	162	39	—	39
C. A. L. Sandstrom, Yundi	163	51	—	51
	164	37	2	39
	165	64	12	76
	166	57	—	57
	167	58	—	58
	168	22	11	33
G. A. Bielby, Pooraka	169	26	50	76
	170	27	36	63
	171	60	14	74
	172	64	9	73
	173	59	9	68
	174	60	7	67
W. M. Field, Yundi	175	32	—	32
	176	28	13	41
	177	61	11	72
	178	23	47	70
	179	23	1	24
	180	57	2	59
T. Duhring, Mallala	181	65	—	65
	182	67	—	67
	183	54	1	55
	184	75	—	75
	185	41	2	43
	186	63	4	67
W. R. Hedger, Yundi	187	67	—	67
	188	*	*	*
	189	17	31	48
	190	46	17	63
	191	74	4	78
	192	—	—	—
A. & H. Gurr, Bradbury	193	39	—	39
	194	57	—	57
	195	48	1	49
	196	61	—	61
	197	69	—	69
	198	49	—	49
J. V. McGinnis, Yundi	199	46	3	49
	200	51	9	60
	201	40	1	41
	202	31	34	65
	203	9	—	9
	204	8	27	35

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	60	3	63
	206	41	—	41
	207	66	—	66
	208	50	14	64
	209	13	3	16
	210	63	2	65
W. C. Jones, Yundi	211	5	79	84
	212	61	25	86
	213	60	2	62
	214	68	8	76
	215	55	2	57
	216	17	8	25
Langmaid & Bettison, Parafield, Salisbury	217	32	7	39
	218	34	—	34
	219	15	10	25
	220	22	1	23
	221	55	1	56
	222	33	4	37
A. Jarvis, Yundi	223	41	14	55
	224	41	38	79
	225	40	21	61
	226	53	2	55
	227	42	12	54
	228	54	6	60
S. Eyles, Clarendon	229	24	19	43
	230	13	54	67
	231	58	—	58
	232	53	3	56
	233	51	3	54
	234	44	—	44
Woodbury Poultry Farm, Stirling East	235	53	9	62
	236	17	8	25
	237	36	1	37
	238	—	9	9
	239	25	—	25
	240	31	1	32
V. F. Gameau, Findon Road, Woodville	241	50	28	78
	242	5	2	7
	243	31	—	31
	244	14	3	17
	245	33	3	36
	246	27	3	30
Geo. Lomax, Yundi	247	43	—	43
	248	19	61	80
	249	35	16	51
	250	27	21	48
	251	—	6	6
	252	45	9	54
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	30	14	44
	254	69	1	70
	255	46	38	84
	256	19	55	74
	257	11	69	80
	258	24	30	54
W. R. Williams, 28, Avenue Road, Frewville	259	77	—	77
	260	46	19	65
	261	5	—	5
	262	71	8	79
	263	59	—	59
	264	69	5	74
R. W. McAllister, Yundi	265	43	38	81
	266	17	14	31
	267	48	9	57
	268	17	14	31
	269	63	1	64
	270	47	20	67
G. W. Sykes, Yundi	271	40	12	52
	272	45	11	56
	273	39	—	39
	274	66	2	68
	275	39	—	39
	276	38	9	47

* Dead.

EGG-LAYING COMPETITIONS—*continued.*

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
	277	53	1	54
A. P. Urlwin,	278	43	5	48
Balaklava	279	54	2	56
	280	33	—	33
A. V. Dupen, Melton	281	76	3	79
Street, Glenelg	282	12	2	14
F. F. Welford,	283	46	—	46
Ludgate Circus,	284	77	—	77
Colonel Light Gardens	285	25	5	30
Thomas & Elson,	286	34	6	40
Clifton Street,	287	24	2	26
Hawthorn	288	46	3	49
J. H. Dowling,	289	48	24	72
Glossop,	290	53	2	55
River Murray	291	53	1	54
	292	—	1	1
E. Pape, Wynarka	293	13	57	70
	294	20	3	23
L. S. Ekers,	295	45	—	45
Mount Jagged Farm,	296	36	—	36
Mount Compass	297	44	—	44
V. E. Williams,	298	38	1	39
57, Fairford Terrace,	299	50	2	52
Semaphore Park	300	69	—	69
L. R. Badcock,	301	33	—	33
77, Findon Road,	302	53	3	56
Woodville	303	56	—	56
W. H. A. Hodgson,	304	52	—	52
Commercial Road,	305	46	1	47
Salisbury	306	69	—	69
	307	75	3	78
Gallagher & Aslin,	308	49	6	55
Pooraka	309	43	—	43
R. C. Crittenden,	310	53	—	53
William Street,	311	29	1	30
Kilkenny North	312	31	3	34
	313	53	-	53
C. H. Lines, Junior,	314	49	23	72
Gladstone	315	51	4	55
	316	57	—	57
A. J. Monkhouse,	317	17	37	54
Woodside	318	28	42	70
	319	79	—	79
B. Cooke,	320	78	1	79
Kanmantoo	321	73	—	73

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
M. O. & C. A. Roberts,	322	25	—	25
Torrens Road,	323	5	1	6
Kilkenny (Minorcas)	324	6	—	6
G. Frisby Smith,	325	21	27	48
Fulham (Minorcas)	326	34	8	42
	327	36	—	36
V. F. Gameau, Findon	328	12	—	12
Road, Woodville	329	47	5	52
(Minorcas)	330	43	12	55
A. Heaysman,	331	21	2	23
Government Road,	332	67	1	68
Eden Hills	333	55	3	58
(Cuckoo Leghorns)				
	334	62	5	67
	335	69	—	69
H. J. Mills,	336	67	13	80
108, Edward Street,	337	54	—	54
Edwardstown	338	66	—	66
	339	92	3	95
	340	80	2	82
	341	2	—	2
A. G. Dawes,	342	50	—	50
Portrush Road,	343	28	1	29
Glenunga Gardens	344	58	17	75
	345	54	1	55
	346	73	8	81
	347	53	9	62
Willow Bend	348	32	7	39
Stud Poultry Farm,	349	51	20	71
North Walkerville	350	26	29	55
	351	5	13	18
	352	34	—	34
	353	32	21	53
H. L. Bastin,	354	59	—	59
Southern Cross	355	24	8	32
Poultry Farm,	356	73	6	79
Pooraka	357	43	19	62
	358	58	1	59
	359	51	12	63
A. C. Byrne,	360	34	2	36
114, Rose Terrace,	361	48	1	49
Wayville West	362	23	17	40
	363	38	2	40
W. R. Williams,	364	38	45	83
28, Avenue Road,	365	69	—	69
Frewville	366	16	6	72
	367	55	-	55
C. H. Lines, Jun.,	368	19	—	19
Gladstone	369	—	—	—
J. H. Dowling,	370	—	—	—
Glossop, River	371	18	—	18
Murray	372	2	1	3
F. F. Welford,	373	48	15	63
Ludgate Circus,	374	62	3	65
Col. Light Gardens	375	65	5	70
Mrs. M. Specht,	376	76	2	78
Holder Avenue,	377	35	—	35
Richmond	378	65	—	65
W. Rentoul Christie,	379	25	1	26
Claremont Avenue,	380	48	—	48
Mitcham	381	—	—	—
G. Frisby Smith,	382	51	1	52
Fulham House,	383	33	37	70
Fulham	384	29	1	30
	385	72	9	81
B. Cooke, Kanmantoo	386	73	10	83
	387	73	12	85

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
	388	36	4	40
A. G. Dawes,	389	71	9	80
Portrush Road,	390	25	—	25
Glenunga Gardens	391	50	—	50
(Rhode Island Reds)	392	74	12	86
	393	59	—	59
	394	33	1	34
A. G. Dawes,	395	70	—	70
Portrush Road,	396	75	—	75
Glenunga Gardens	397	67	—	67
(Rhode Island Reds)	398	38	8	46
	399	70	11	81

Egg-laying Competitions—*continued.*

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
E. F. Snow, 18, Mount	400	44	2	46
Barker Road, Glen	401	25	—	25
Osmond (Rhode Island Reds)	402	72	—	72
W. R. Williams, Avenue	403	21	—	21
Road, Frewville	404	43	—	43
(Rhode Island Reds)	405	51	—	51
Woodbury Poultry Farm,	406	47	10	57
Stirling East	407	77	9	86
(Rhode Island Reds)	408	68	16	84
V. F. Gameau, Findon	409	48	—	48
Road, Woodville	410	12	—	12
(Rhode Island Reds)	411	26	—	26
K. Pennack,	412	64	—	64
Pooraka	413	30	—	30
(Barnevelders)	414	69	—	69
Section II.—Dry Mash.				
Class No. 5.—White Leghorns.				
	415	33	2	35
	416	38	—	38
A. O. Dawkins, Gawler	417	26	14	40
	418	49	4	53
	419	68	4	72
	420	58	13	71
A. V. Dupen, Melton	421	24	—	24
Street, Glenelg	422	8	—	8
	423	62	—	62
	424	63	6	69
A. J. Monkhouse,	425	51	4	55
Woodside	426	55	2	57
Class No. 7.—Black Orpingtons.				
	427	11	—	11
	428	15	—	15
A. C. Byrne, 114, Rose	429	26	—	26
Terrace, Wayville	430	40	7	47
West	431	55	5	60
	432	40	1	41
G. Frisby Smith,	433	55	—	55
Fulham House,	434	45	11	56
Fulham	435	83	4	87
Home Project Utility Section.				
John Plummer, Virginia School	436	38	2	40
Dudley Harper, Murray Bridge School	437	43	1	44
Jack Beauchamp, Murray Bridge School	438	12	1	13
Jack Beauchamp, Murray Bridge School	439	22	9	31
George Bielby, Abattoirs School	440	*	*	*
Eric Pratt, Abattoirs School	441	63	2	65
Stanley Pratt, Abattoirs School	442	49	3	52
Mervyn Steer, Sturt School	443	65	7	72
Donald Welford, Westbourne Park School	444	44	—	44
E. Zbierski, Gawler School	445	58	4	62
J. McInerney, Gawler School	446	40	24	64
F. Martin, Gawler School	447	58	1	59
Darcey Colman, Mallala School	448	46	7	53
Kevin Angus, Mallala School	449	43	15	58
Alwin Scott, Wellington Road School	450	54	5	59
Jack Dietman, Wellington Road School	451	60	6	66
Milton Smith, Salisbury School	452	79	—	79
Owen Robinson, Ascot Park School	453	19	—	19
Paul Mundy, Urrbrae High School	454	40	4	44
Max Couche, Thebarton School	455	69	—	69
Robert Swift, Murray Bridge School	456	73	—	73
Bruce Dooland, Thebarton Central School	457	23	21	44
Ian Slee, Two Wells School	470	24	* —	24

All birds in this section are White Leghorns with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
F. F. Welford,	458	78	—	78
Ludgate Circus,	459	51	2	53
Col. Light Gardens	460	94	2	94

The above birds are Black Orpingtons, and together with Nos. 373-375, will constitute a team in Class No. 3.

Class No. 4.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
G. W. Lindsay,	461	28	45	73
Torrens Road,	462	33	14	47
Kilkenny (Langshans)	463	47	5	52

Class No. 1.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
	464	45	2	47
Gallagher & Aslin,	465	59	2	61
Pooraka	466	51	2	53

The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
	467	18	—	18
W. O. Slape, Magill	468	30	—	30
	469	41	1	42

Class No. 2.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
Langmaid & Bettison,	471	14	10	24
Parafield, Salisbury	472	33	5	38
(Black Minorcas)	473	58	4	62

* Dead.

EGG-LAYING COMPETITIONS—*continued.*

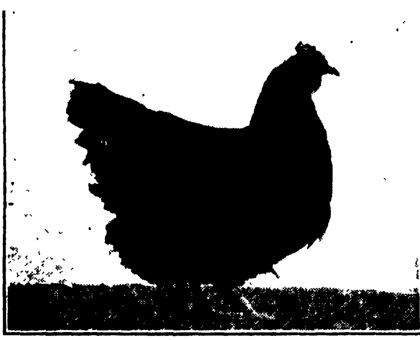
Competitor.	Bird No.	1st Grade	2nd Grade	Total.
Class No. 1.				
	474	77	8	85
	475	7	—	7
Willow Bend Stud	476	43	2	45
Poultry Farm, North	477	18	—	18
Walkerville	478	79	—	79
	479	74	—	74

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
Class No. 3.				
	480	76	—	76
	481	43	4	47
Willow Bend Stud	482	53	—	53
Poultry Farm, North	483	55	13	68
Walkerville	484	70	3	73
	485	42	1	43

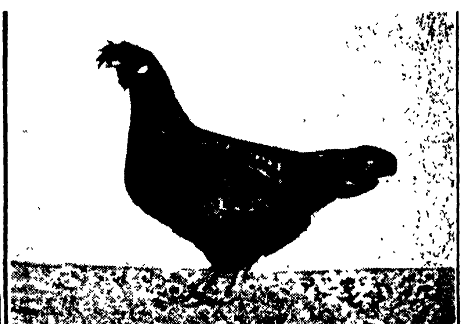
The following table is an interesting one and shows the numbers of first grade, second grade, and total number of eggs laid from April 1st, 1934, to July 31st, 1934, in the various sections :—

Class.	Type of Bird.	Type of Mash.	No. Birds.	First Grade Eggs Laid.	Second Grade Eggs Laid.	Total Eggs Laid.	Percentage First Grade Eggs.
1	White Leghorns.....	Wet Mash	327	14,264	2,925	17,189	82
2	Any other light Breed	Wet Mash	15	477	78	555	85
3	Black Orpingtons ...	Wet Mash	63	3,023	388	3,411	88
4	Any other heavy Breeds	Wet Mash	30	1,473	146	1,619	90
5	White Leghorns.....	Dry Mash	12	535	49	584	91
7	Black Orpingtons ...	Dry Mash	9	370	28	398	92
	Home Project Utility Section	Wet Mash	22	1,022	112	1,134	90

In Class 1 six birds have died, and one bird died in the Home Project Utility Section, April 1st and July 31st.



Leading bird in all sections, a Black Orpington, owned by Mr. F. F. Welford, Colonel Light Gardens; score, 94 first-grade eggs.



Leading bird, Section 2, any Light Breed other than White Leghorn. A Cuckoo Leghorn, owned by Mr. A. Heaysman, Eden Hills; score, 67 first-grade eggs.

The following table shows the leading birds at the end of the Winter Test :—

SECTION 1.—WET MASH.—*First Grade Eggs only.*

Class 1.—White Leghorns.

Singles—	Eggs Laid.	Bird Nos.
S. Hill	86	39
Willow Bend Stud Poultry Farm	79	478
J. O. Marshall	79	86
B. R. Whittington	79	141
B. Cooke	79	319

	Eggs Laid.	Bird Nos.
Trios—		
B. Cooke	230	319-321
W. R. Williams	199	262–264
W. Restall	189	43-45
Teams—		
T. Duhring	365	181–186
A. H. Matthews	345	7–12
W. R. Williams	327	259–264

Class 2.—Any other light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	67	332
Langmaid & Bettison (Minorca)	58	473
A. Heaysman (Cuckoo Leghorn)	55	333
Trios—		
A. Heaysman (Cuckoo Leghorns)	143	331–333
Langmaid & Bettison (Minorcas)	105	471–473
V. F. Gameau (Minorcas)	102	328–330

Class 3.—Black Orpingtons.

Singles—		
F. F. Welford	94	460
H. J. Mills	92	339
A. G. Dawes	80	340
Trios—		
F. F. Welford	223	458–460
B. Cooke	218	385–387
H. J. Mills	212	337–339
Teams—		
H. J. Mills	410	334–339
F. F. Welford	398	373–375 and 458–460
Willow Bend Stud Poultry Farm	339	480–485

Class 4.—Any other heavy Breed.

Singles—		
Woodbury Poultry Farm (Rhode Island Red)	77	407
A. G. Dawes (Rhode Island Red)	75	396
A. G. Dawes (Rhode Island Red)	74	392
Trios—		
Woodbury Poultry Farm (Rhode Island Red)	192	406–408
A. G. Dawes (Rhode Island Red)	183	391–393
A. G. Dawes (Rhode Island Red)	178	394–396
Teams—		
A. G. Dawes (Rhode Island Red)	353	394–399
A. G. Dawes (Rhode Island Red)	315	388–393

SECTION 2.—DRY MASH.

Class 5.—White Leghorns.

Singles—		
A. O. Dawkins	68	419
A. J. Monkhouse	63	424
Trios—		
A. O. Dawkins	175	418–420
A. J. Monkhouse	169	424–426
Teams—		
A. O. Dawkins	272	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	83	435
G. Frisby Smith	55	433
A. C. Byrne	55	431

	Eggs Laie.	Bird Nos.
Trios—		
G. Frisby Smith	183	433–435
Teams—		
A. C. Byrne	187	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.		
Milton Smith, Salisbury (White Leghorn)	79	452
Robert Swift, Murray Bridge (Black Orpingtons)	73	456
Max Couche, Thebarton (Rhode Island Red).....	69	455
Mervyn Steer, Sturt (White Leghorn)	65	443
Eric Pratt, Abattoirs (White Leghorn)	63	441

The results for the winter test are satisfactory, the leading bird being a Black Orpington pullet owned by Mr. F. F. Welford, this bird has laid 94 eggs, all of which were first grade.

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.

Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to July 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to June 30th, 1934.	No. Eggs Laid Month of July, 1934.	Total Eggs Laid April 1st, 1933, to July 31st, 1934.
No. 1 test	8,329	535	8,864
No. 2 test	7,781	456	8,237
No. 3 test	7,378	478	7,856
No. 4 test	8,749	489	9,238
No. 5 test	3,792	425	4,217

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

LOWER NORTH PRUNING CHAMPIONSHIPS.

The annual vine and fruit tree pruning championship of the Lower North Agricultural Bureaux was held on the property of Messrs. D. A. Tolley, Ltd., Dorrien, on Wednesday, July 11th, the arrangements of the fixture being in the hands of a committee chosen from each branch represented in the Competitions. Secretarial duties were carried out by Messrs. J. S. Hammatt and S. Turnbull.

FRUIT TREE SECTION.

Judges—Messrs Bert. Boehm and J. B. Harris.

Competitor.	Branch.	Apricot.	Prune.	Peach.	Pear.	Total.
G. Boehm	Light's Pass	88	86½	95½	81	351
F. Boehm	Light's Pass	87½	87	86	89	349½
O. Burford	Watervale	82	81	89	88	340
E. G. Helbig	Greenock	88	77	94	80	339
E. Burgess	Watervale	84	82	82	86	334
J. B. Helbig	Greenock	81	73½	88	90	332½
C. A. Hoffman	Lone Pine	85	84	85	77½	331½
S. Turnbull	Lone Pine	84½	84½	79	83	331
A. Andriske	Lone Pine	85	82½	85½	77	330
A. S. Burgess	Watervale	80½	78	80	90	328½
C. F. Wilksch	Greenock	82½	84	74½	87	328
E. Boehm	Light's Pass	84	78	81	80	323
G. Turner	Penwortham	79	83	80	80	322
F. L. Burgess	Penwortham	87	72½	82	77	318½
D. J. Bain	Williamstown	75	78	79	82	314
C. S. Wyman	Penwortham	75½	78	75	76½	305

VINE SECTION.

Judges—Messrs W. Boehm and J. L. Williams.

Competitor.	Branch.	Bush Spur.	Rod and Spur.	Total.
O. B. Kurtz	Light's Pass	94½	89½	184
W. Ahrens	Light's Pass	88	89½	177½
A. J. Leske	Williamstown	90	86½	176½
R. Gallasch	Koonunga	87	89½	176½
A. Obst	Greenock	85½	90	175½
E. P. Filsell	Lyndoch	90	82½	172½
G. Boehm	Light's Pass	81½	91	172½
C. R. Helbig	Greenock	83½	87	170½
H. O. Helbig	Greenock	83	86½	169½
C. G. Fromm	Williamstown	84	84	168
G. Merritt	Watervale	87½	81	168½
O. Burford	Watervale	80	86	166
L. G. Harper	Lyndoch	84½	80½	165
A. Linton	Lyndoch	82½	81½	164
H. Kromer	Lone Pine	85	79	164
A. Smith	Watervale	82½	80½	163
E. Riebke	Koonunga	77	86	163
J. B. Mickan	Koonunga	84½	75½	160
H. Parbs	Lone Pine	82	77	159
B. T. Fromm	Lone Pine	79	78½	157½
V. Duke	Penwortham	80½	77	157½
C. S. Wyman	Penwortham	74½	74	148½
F. L. Burgess	Penwortham	69	63½	142½

LANGDON PARSONS TROPHY.

This trophy donated by Mr. W. Langdon Parsons, will be awarded to the competitor in the local competitions who obtains the highest aggregate points in both the Fruit Tree and Vine Sections during the years 1934, 1935, 1936.

The Committee, Lower North Pruning Championships.

The following competitors have obtained 500 points and over as follows :—

Competitor.	Branch.	Points.	Competitor.	Branch.	Points.
G. Boehm	Light's Pass	548	H. Linton	Angaston	519
J. B. Helbig	Greenock	541½	A. Smith	Watervale	518½
E. G. Helbig	Greenock	536	C. S. Wyman	Watervale	518
W. O. Baker	Watervale	531	H. Kappler	Lone Pine	517½
A. Hentschke	Lone Pine	530½	K. Boehm	Light's Pass	517
S. Turnbull	Lone Pine	529½	A. B. Fromm	Lone Pine	516
C. F. Wilksch	Greenock	528	W. B. Koop	Light's Pass	509½
A. S. Burgess	Watervale	527½	W. Ahrens	Light's Pass	508
O. Burford	Watervale	527½	V. M. Duke	Penwortham	507½
F. L. Burgess	Penwortham	527	F. Nayda	Penwortham	507
A. T. Leske	Williamstown	525	E. Kruger	Light's Pass	502½
F. Boehm	Light's Pass	522½	C. G. Fromm	Williamstown	500½
E. Boehm	Light's Pass	520½			

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF MURRAY LANDS BRANCHES.

The Annual Conference of Branches situated in the Western Murray Lands Division met at Karoonda on July 31st. Delegates were present from the Wynarka, Copeville, Karoonda, Borrika, Coomandook, Lameroo, Yurgo, Nunkeri, and Kulkawirra Branches.

Mr. C. L. Bruce presided and the opening address was delivered by Mr. A. J. A. Koch, who attended on behalf of the Advisory Board. Professor A. J. Perkins, Messrs. W. J. Spafford, R. L. Griffiths, P. H. Suter, C. McKenna, B.V.Sc., H. C. Pritchard, and F. C. Richards represented the Department of Agriculture.

The following papers were read and discussed:—"Methods of Fallowing," G. Sutherland (Copeville); "The Present Day Position of the Farmer," H. Sanders (Nunkeri); "Can Wheat Growing be Made Profitable," E. L. Cowled (Borrika); "Ten Years' Experience of Mallee Farming," R. Elliott (Kulkawirra); "Destruction of Foxes," W. R. Trestrail (Coomandook).

Mr. Koch presented Life Membership Certificates of the Agricultural Bureau to Messrs. G. L. Bonython, E. H. Huxtable, V. V. Brown, L. G. Huxtable, H. S. Green, and J. Waters, of the Borrika Branch.

RESOLUTIONS.

"That the Advisory Board be asked to support the resolution: 'That this Conference ask the Government to allow farmers a free hand in the matter of the proportion of wheat and oats they are allowed to sow.' "

It was decided that the 1935 Conference should be held at Karoonda under the auspices of the Borrika Branch.

"That the Advisory Board of Agriculture be asked to co-operate with farmers generally to refute statements made by several members—as reported in 'Hansard' Nos. 1 and 2 of this session: 'That the Farmers Assistance Act is working admirably and smoothly throughout the State,' and to point out the necessity for drastic amendments to the Act." A committee consisting of Messrs. Aikens, Sutherland, Sanders, Tregilgas, and Coombe made the following suggested alterations to the Farmers Assistance Act, which were subsequently carried by the Conference:—

1. Decentralisation of control of Farmers Assistance.
2. Where a farmer is able to make his own financial arrangements, provision to be made for protection without an application being made under the Farmers Assistance Act.
3. Farmers to have the sole right of deciding what areas of wheat and oats are to be seeded and the respective areas of each.
4. Farmers to have the right to decide quantities of super to be used not exceeding 112lbs. per acre.
5. Farmers to have the right to decide quantities of seed per acre not exceeding 60lbs. of graded seed.
6. Farmers to have the right to sell their own wheat, such wheat to be sold not later than July 31st in each year.
7. The present sustenance allowance is insufficient. It is suggested that the present basis of calculating the allowance be adhered to, not at a rate per week, but at per hour, so that extra hours worked by farmers will be taken into consideration. It is pointed out that the cost of living is much greater in the country than in the city, and that the extra hours worked by farmers entail a greater consumption of food.
8. A greater measure of co-operation by the Farmers Assistance Board with farmers and the Department of Agriculture through the District Agricultural Instructors.
9. It is suggested that no restrictions be placed on farmers when arranging their seeding programme with a view to providing reserves of fodder, and that there be no compulsion to force farmers to sell reasonable reserves of fodder.
10. The Debt Adjustment sections of the Farmers Assistance Act to be extended and put in operation immediately.
11. Reduction of interest on hire purchase agreements.

Conference resolved that a petition requesting the Government to make a reduction in the valuation of land, which was drawn up by Mr. Jones, of the Wynarka Branch, should, on being compiled, be forwarded to the Commissioner of Crown Lands.

The Evening Session was occupied with an address, "Ailments of Farm Stock," by Mr. O. McKenna, of the Stock and Brands Department.

A Special Session was held for Women, at which Miss E. Campbell, of the Education Department, delivered an address, "The Uses of Hessian in the Home."

UPPER NORTH BRANCHES IN CONFERENCE.

With an excellent attendance of delegates from the Yandiah, Wilmington, Morchard, Willowie, Wepowie, Richman's Creek, Murraytown, and Eurelia Branches, the Upper North Bureau Conference was held at Wilmington on July 18th. Mr. F. Coleman (Member, Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), C. McKenna, B.V.Sc., M.R.C.V.S. (Veterinary Officer), C. A. Goddard (School of Mines), E. L. Orchard, J. B. Harris, J. O. Hatter (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary, Agricultural Bureau) attended on behalf of the Department of Agriculture.

Mr. M. Christopherson (Chairman of the Wilmington Branch) presided, and the opening address was delivered by Mr. F. Coleman.

The following papers were read and aroused keen discussions:—"Aberdeen Angus Cattle", by Mr. C. Cole (Wilmington); "Factors Influencing the Fixing of Prices", Mr. O. Knauerhause (Wepowie); "Farming as a Business Proposition", Mr. S. McCallum (Willowie); "Observance of Practical Farming", Mr. J. G. Schuppan (Wilmington); "Improving the Standard Sample of South Australian Wheat", Mr. E. H. Hampel (Wilmington); "Handling and Care of a Small Flock of Sheep," Mr. G. Fraser (Wilmington). Officers of the Department took part in the discussions and replied to questions.

Delegates at Upper North Conference, Wilmington, July 18th.

Mr. F. Coleman presented the trophies to the following successful competitors in the Far North Crop Competition:—First prize, Mr. E. H. Hampel, of Wilmington; second prize, Mr. R. C. Llewellyn, of Morchard; and third prize, Mr. E. A. Schulz, of Wilmington.

The following resolutions were carried:—"That the 1935 Conference be held at Pekina under the auspices of the Wepowie Branch." "That owing to the break of gauge—stock having to be yarded at the station two nights previous to market—we request the Government to allow stockowners 120 miles or over from the Abattoirs to co-operate in transporting livestock to the Abattoirs market by primary producers' trucks." "That the Government rescind the present butterfat test system and revert to the commercial value system." "That this Conference strongly recommends that the Government be requested to continue the holding of the Annual Bureau Congress under the same conditions as have obtained in the past."

Mr. C. McKenna addressed the Conference on "Common Ailments of Farm Stock."

THE TREATMENT OF WOUNDS IN FARM STOCK.

[An Address Broadcast through 5CL, Adelaide, by MR. A. H. ROBIN, B.V.Sc., *Veterinary Officer, Stock and Brands Department.]*

No matter how careful an owner may be in safeguarding his stock, accidents will happen to them—a horse will pick up a nail in his foot, get hung up in a barbed wire fence, or get kicked by another horse, or, again, a cow will get horned by another one, and so on.

When such things happen they must, of course, just be met and steps taken to effect the necessary repairs. In country districts, particularly, the job of doing this will as a rule devolve upon the stockowner himself, owing to there being no trained veterinarian available to do the "doctoring" for him, and he ought, therefore, to have a knowledge of the general principles of wound treatment so as to be able to handle satisfactorily each and every case as it arises.

The first thing to be done in dealing with any wound is to control the bleeding. Where this is slight, it will usually stop quickly of its own accord. But when it is more severe, steps have to be taken to hasten its cessation to avoid any undue loss of blood. Excepting where one or more large blood vessels have been cut or torn, this can generally be effected by plugging the wound tightly with cotton wool, or by liberally dusting on some styptic agent, such as powdered alum, flour, or finely ground tea leaves, or by repeated applications of very hot water. If the wound is on a limb, a thick pad of cotton wool, either by itself or impregnated with any of the agents I have just mentioned could be applied over the wound and held in position by tight bandages, which should then be left undisturbed for 24-36 hours, so that when they are taken off for further treatment of the wound, the bleeding will not be likely to recur.

If, on account of one or more large blood vessels being cut, these measures are ineffective, and there is danger of the animal bleeding to death, an attempt should be made to pick up and tie a ligature round the ends of the bleeding vessels. Failing this, as a last resort, the end of a poker could be heated to a dull red heat and applied lightly to them a few times when success will result. This treatment may somewhat retard ultimate healing of the wound, but there need be no fear of bad results ensuing from it.

The next step is to cleanse the wound, and this should be done by bathing or irrigating it with clean warm water to which has been added a little lysol or other antiseptic. If the wound is a clean cut one, it is best to use as little solution as possible, but if it is a badly torn one, then plenty of solution should be used to wash it thoroughly and remove every piece of dirt, grit, &c.

Simple cuts and wounds will, as a rule after this, require no further treatment beyond dusting occasionally with boracic acid or other antiseptic dusting powder.

If the wound is, however, a large gaping one it will be necessary to bring its edges together by stitching, so as to get rapid healing with a minimum of scarring.

If proper suturing appliances are not available, a small bag needle and a fairly stout piece of clean string will answer the purpose quite well, both needle and string, of course, being soaked in an antiseptic solution before use.

Before commencing the stitching, the hair and any shredded flesh at the edges of the wound should be trimmed off with scissors, though torn pieces of skin are better left until it is certain that they are dead before removing them.

In carrying out the stitching, a series of separate stitches should be put in, tying each with its own knot so that if later one or two of them should break away, the whole wound will not gape. In putting the stitches in, give them plenty of hold; it does not hurt the animal any more to put them in ¼in. from the edges of the wound than it does to put them in nearer, and there is then less chance of their subsequently tearing out. Each stitch should be tied as it is put in, gradually bringing the edges of the wound together as closely and evenly as possible, and about ¾in. should be allowed between the stitches.

If a needle is not available for stitching to be done in this way, ordinary pins could be used in the emergency by sticking them transversely through the two edges of the wound, bringing these together and making fast with piece of string tied in a figure of 8 round the projecting ends of the pins.

Most wounds that are bad enough to require stitching will, in the course of a day or two start to discharge matter, and one or two of the lower stitches may then have to be removed to provide drainage for this. Subsequently the wound should be gently irrigated daily with weak antiseptic solution till the discharge ceases, when these watery dressings should be discontinued and dry dressings only used until healing is completed.

Any growth of "proud flesh" that that forms in the wound during its healing should be controlled by the judicious application from time to time, as is found necessary, of a little bluestone, but care should be

taken that this dressing is not allowed to come into contact with the new skin growing over from the edges of the wound, for the bluestone would eat this away, just as it does the proud flesh, and the healing over of the wound would be retarded. If wounds are situated on the limbs anywhere below the knee or hock proud flesh is extremely likely to appear in them, and the most effective way to check its growth is to keep the wounds regularly bandaged in between dressings till they are completely healed over. Otherwise a bad scar will remain to depreciate the animal's market value.

Contused or badly bruised wounds require a special treatment in their early stages. With them, hot antiseptic fomentations should be applied frequently in order to allay inflammation and prevent, as far as possible, death and sloughing of the injured tissues. After the acute inflammation has subsided, the subsequent treatment of them as may be necessary follows on the lines I have detailed for clean cut or lacerated wounds.

Punctured wounds, such as are made by pointed stakes, nails, pellets of shot, &c., should be carefully explored with a sterile probe to determine their depth and direction, and whether there is any foreign body present in their depths. This probing should be carried out very carefully, especially if the wound is in the vicinity of a joint.

If a foreign body is present, it must be removed before healing of the wound will take place, and to effect its removal it may be necessary to enlarge the surface opening of the wound with a knife or pair of scissors, so that it may be reached and got out. Even where there is no foreign body present it may be taken as a broad general rule in dealing with punctured wounds, that enlarging their openings is good, sound practice, as it enables their depths to be more readily and more thoroughly cleansed, and it permits of better drainage for the discharge of matter that is certain to follow in a day or so. Otherwise this type of wound will often close over on the surface, imprisoning the pus, which, gradually increasing in amount and having no outlet, will start to burrow in the adjacent tissues and so complicate matters.

If the direction of a punctured wound be such that it cannot be effectively drained through its surface opening, another artificial opening for drainage should be made through the skin at some suitable spot lower down, and this connected up with the bottom of the wound. Regular daily irrigations with an antiseptic solution must, of course, again be practised so long as the wound discharges.

In the case of punctured wounds in the sole of the foot—and these are very common accidents with horses—a little turpentine run into them immediately they occur will often prevent any further trouble from developing with them. If, however, a day or two after such a wound has been received, the animal becomes very lame, the puncture must be well opened up with a blacksmith's foot knife so that matter that has formed there may escape and any foreign body, such as a nail, &c., be located and removed. The foot should then be immersed in a bucket of hot antiseptic solution for 20 to 30 minutes, or even longer if possible, after which it should be taken out of the bath, dried without being allowed to touch the ground, a little tincture iodine run into the wound, and the whole foot finally encased in a piece of sacking to keep it free from soilage by contact with the ground. This method of dressing

should be repeated once or twice daily till the discharge ceases and lameness disappears, after which the wound in the sole should be filled with Stockholm tar and plugged with a pledget of tow or cotton wool, or a leather sole can be fitted under the shoe to protect the wound until it has healed over.

In conclusion, in all cases of severe wounding the animal should be given a dose of physic and be kept on light diet.

Precautions should also be taken to protect wounds against attack by flies, and if this cannot be obtained by bandaging, or otherwise covering them over, so that they remain exposed, a very satisfactory application which can be used to smear round the edges of them to keep the flies away is a mixture of 1 pint of oil of tar and 1gall. of crank case oil.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, July 25th, 1934, there being present Messrs. A. J. Cooke (Chairman), A. L. McEwin, H. N. Wicks, P. J. Baily, F. Coleman, J. B. Murdoch, A. J. A. Koch, Professor A. J. Perkins, Professor A. E. V. Richardson, and H. C. Pritchard (Secretary).

Resignation.—The Secretary read correspondence from Mr. A. J. Cooke, conveying to the honourable the Minister his regret that on account of pressure of work and greater business responsibilities, he was compelled to resign his seat on the Board as from the date of the August meeting. At the special request of members of the Board, Mr. Cooke consented to act as Chairman until the next meeting.

New Branch.—Approval was given to the formation of a new Branch at Echunga, with the following persons as foundation members:—Messrs. E. Dennis, A. Hauber, C. W. Lampard, E. D. Webb, T. Grisswood, A. Stevens, F. H. Wickham, L. H. Walters, J. E. Assender, D. J. Foxwell, T. E. Hincks, S. Lambert, F. A. Merrit, C. McDonald, W. H. L. Norman, A. T. Rodger, W. Restall, L. W. Sando, G. Symes, and R. W. C. Swincer.

Life Membership.—The following persons were approved as life members of the Agricultural Bureau:—J. E. Quick (Yandnarie), S. H. Pearce, J. Saunders, Geo. Tucker (Strathalbyn), A. K. Ashby (Blackwood), A. J. Bartlett (Willowie), L. A. Orwell, E. F. Davidson (Lameroo), S. Sanders (Moorook), S. H. Goldsworthy, A. D. Matheson, M. McBain, J. M. Yelland, W. S. Yelland (Milang).

New Members.—The following names were added to the rolls of existing Branches:—Frances—J. McDonald; Berri—J. T. Robertson, W. H. Chilton; Laura Bay—Joel Lowe, Brian Stapleton; Belalie Womens—Mrs. H. Bailey, Mrs. K. Symonds; Snowtown—C. M. Dolling; Snowtown Womens—Mrs. G. Jamieson, Sister Kenihan, Sister Mudge, Mrs. F. A. Pritchard, Mrs. E. Pridham, Miss M. Slattery, Mrs. B. Thomas, Mrs. A. V. Walkington, Mrs. H. A. Woodhouse, Mrs. E. S. Allen, Mrs. C. Atkinson, Mrs. J. B. Dolling, Mrs. E. Hupfield, Mrs. N. B. Hawkins, Mrs. G. Herbert, Mrs. L. V. Hancock, Mrs. T. Jenkins, Mrs. A. J. Jensen, Mrs. J. E. Pridham, Mrs. J. Slattery, Miss S. Wittwer; Apilla—L. B. Klemm; Clare Womens—Mrs. J. T. Miller, Miss V. Gillen; Renmark—J. N. Price, J. Showell, W. Appleby, T. M. Appleby; Angaston—Rae. Robinson; Kapinnie—T. R. Reynolds, K. Lawrence; Roberts and Verran—E. Ramsey, T. Masters, W. Standing; Taplan Womens—Mrs. R. Clark; Yadnarie—K. R. Kobelt; Black Rock—W. Crosby, F. Benschke; Yundi—J. A. Gryst; Yadnarie—H. W. Pfitzner, R. M. Spriggs.

No. of new members, 49; present No. of members, 7,772; present No. of Branches, 336.

Several items were discussed in Committee.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.
JUNE, 1934.

IMPORTS.

Interstate.

Apples (bushels)	420	Potatoes, sweet (bushels)	63
Apples, custard (bushels)	11	Swedes (bags)	87
Bananas (bushels)	11,604	Bulbs (packages)	34
Citrus—		Plants (packages)	115
Grape Fruit (bushels)	2	Seeds (packages)	34
Mandarins (bushel)	1	Trees, fruit (packages)	36
Oranges (bushels)	2	Trees, ornamental (packages)	8
Passion fruit (bushels)	239	Wine casks (No.)	2,206
Paw Paws (bushels)	2		
Pineapples (bushels)	1,265	*Fumigated—*	
Peanuts (bags)	185	Trees, fruit (packages)	34
Peanut kernels (bags)	96	Trees, ornamental (packages)	6
Beans (bushels)	9	Wine casks (No.)	33
Potatoes (bags)	35,174		

Overseas.

(State Law.)

Wine casks (No.) 938

Federal Quarantine Act.

	Packages.	lbs.		Packages.	lbs.
Seeds, &c.	4,502	779,833	Tea chests	1,158	—
Canes	121	—	Timber	143,212	1,082,260 sup. ft.
Cocoanut chests	709	—			

EXPORTS.

Federal Commerce Act.

		Packages.			Packages.
Egypt	Apples	50	New Zealand	Plants	16
England	Apples	1,757		Seeds	188
	Citrus—Oranges	25,201	Singapore	Apples	98
France	Citrus—Oranges	8		Pears	99
Germany	Citrus—Oranges	6		Citrus—	
India	Apples	1,228		Oranges	22
	Pears	20		Lemons	12
	Citrus—Oranges	56		Vegetables	96
	Vegetables	93	South Africa	Plants	1
Netherlands, East Indies	Apples	1,437	Straits Settlements	Potatoes	15
	Citrus—Oranges	83		Other vegetables	11
	Vegetables	53			

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. SANDFORD & Co., LIMITED, reported on August 1st, 1934.

BUTTER.—Conditions in connection with the dairying industry so far this season are very parlous. No finality has yet been reached in regard to an equalisation plan, and those engaged in the industry are awaiting, with interest, the outcome of the proposed Act to stabilize prices. Production generally is very backward indeed and the record drought conditions are making it very difficult for the men on the land. Hand-feeding has been in vogue for many months, but feed for the stock is now getting very short on most farms, and with the pastures so backward, butter production is only about 50 per cent. of what it was at the corresponding period last year. Fortunately the London market has shown a little improvement recently, and at date choicest Australian was selling at 73s. per cwt. Local rates are:—Choicest creamery fresh butter in bulk, 1s. 0¼d. per lb.; prints and delivery extra (these prices are subject to stabilization levies); store and collectors lots, 6½d. to 7½d. per lb. at store door, according to quality.

CHEESE.—The South-Eastern factories are experiencing better conditions than in the north, and supplies are now steadily improving. Fortunately they have had more rainfall in these districts and the pastures are in fairly good growth. Exporting of cheese will commence, and this ought to relieve the market of the increasing stocks. Local and interstate sales have been slow for several weeks past, but will, no doubt,

improve when holders' stocks have been consumed. Present prices are:—Large and medium, 8½d. to 8¾d. per lb.; loaf, 8¾d. to 9¼d. per lb.; semi-matured and matured, 8¾d. to 9½d. per lb.

EGGS.—The production of eggs in country districts is backward, due, no doubt, to the lack of greenfeed. There was, however, a seasonal increase during the last few weeks, but it does not seem likely that the arrears will be made up. Exporting is now in full swing. Rates at present are:—Ordinary country eggs, fair average quality, 9d. per dozen; export quality, 1⅞ozs. and over, up to 10d. per dozen.

BACON.—Sales of bacon continued well up to the average, but buyers operated more particularly for middle cuts and boneless rolls. Hams are still slow of sale, which is usual during the colder months of the year. Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; rolls, 8d. to 8½d.; hams, 11d. to 11½d.; cooked, 1s. 2d. to 1s. 2½d. per lb.; lard prints, 6½d. per lb.

ALMONDS.—Are selling readily and better supplies are reaching the open markets. Values are steady. Softshells and Brandis, 8½d. to 9d. per lb.; hardshells, 5½d. per lb.; kernels, 1s. 11d. to 2s. per lb.

HONEY.—Sales so far this season have been disappointing, although the production has been less than last year. The carry over of stocks was more than sufficient for all needs, and considerable stocks are still on hand. Rates are:—Prime quality clear extracted, 3d. to 3½d. per lb.; lower grades, 2d. to 2½d. per lb.

BEESWAX.—Sold freely from week to week and values are steady; 1s. 4d. to 1s. 4½d. per lb., according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday, and our sale rooms are the best equipped in the State. Supplies have improved during the last week or two but with retail distributors short of stocks in cold stores, a good demand was experienced at each of the sales. We advise consigning. Crates loaned free on application. The following are the prices realised:—Prime roosters, 3s. 7d. to 4s. 8d.; nice conditioned cockerels, 3s. to 3s. 6d.; fair conditioned cockerels, 2s. 4d. to 2s. 11d.; chickens, lower; heavyweight hens, 2s. 8d. to 3s. 4d.; medium hens, 2s. to 2s. 6d.; light hens, 1s. 8d. to 1s. 11d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 3s. 6d. to 4s. 6d.; young Muscovy ducks, 2s. 2d. to 2s. 11d.; ordinary ducks, 1s. 6d. to 2s. 3d.; ducklings, lower; geese, 2s. 8d. to 3s. 7d.; goslings lower; turkeys, good to prime condition, 8d. to 11d. per lb. live weight; turkeys, fair condition, 6½d. to 7½d. per lb. live weight; turkeys, poor and crooked-breasted, lower; pigeons, 4½d. to 5d. each.

POTATOES.—New season's, 10s. per cwt.

ONIONS.—Brown Spanish, 9s. 6d. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of July, 1934, also the average precipitation for July, and the average annual rainfall.

Station.	For July, 1934.	Av'ge. for July.	Av'ge. Annual Rain-fall.
Far North and Upper North.			
Oodnadatta	0·05	0·22	4·69
Marree	0·04	0·32	5·93
Farina	0·08	0·36	6·48
Copley	0·38	0·46	7·93
Beltana	0·61	0·55	8·53
Blinman	0·73	1·08	11·92
Hookina	1·58	1·15	11·46
Hawker	1·64	1·25	12·31
Wilson	1·35	1·19	11·82
Gordon	1·15	0·93	10·59
Quorn	0·80	1·45	13·29
Port Augusta	0·72	0·72	9·46
Bruce	0·75	0·95	9·95
Hammond	0·81	1·04	11·27
Wilmington	1·12	2·03	17·43
Willowie	1·31	1·27	12·28
Melrose	1·54	2·85	22·94
Booleroo Centre	1·40	1·62	15·23
Port Germein	0·54	1·15	12·55
Wirrabara	1·12	2·38	19·34
Appila	0·98	1·55	14·66
Cradock	1·25	0·97	10·83
Carrieton	0·94	1·26	12·29
Johnburg	0·61	0·95	10·59
Eurelia	0·82	1·27	12·85
Orroroo	0·86	1·33	13·23
Nackara	0·98	0·98	11·18
Black Rock	0·73	1·19	12·43
Oodlawirra	0·78	1·07	11·67
Peterborough	1·01	1·24	13·27
Yongala	1·27	1·46	14·47
North-East.			
Yunta	0·67	0·57	8·54
Waukaringa	0·91	0·57	7·97
Mannahill	0·58	0·57	8·21
Cockburn	0·88	0·50	7·98
Broken Hill, N.S.W.	1·32	0·71	9·57
Lower North.			
Port Pirie	0·57	1·24	13·26
Port Broughton	0·93	1·51	13·92
Bute	1·17	1·91	15·49
Laura	1·23	2·05	17·99
Caltowie	0·78	1·77	16·75
Jamestown	1·00	2·03	17·75
Gladstone	1·27	1·81	16·33
Crystal Brook	0·72	1·68	15·82
Georgetown	0·84	2·06	18·41
Narridy	0·82	1·70	15·88
Redhill	1·14	1·88	16·61
Spalding	1·21	2·09	18·99
Gulnare	1·16	2·20	18·71
Yacka	1·11	1·72	15·40
Koolunga	1·06	1·74	15·43
Snowtown	1·29	1·75	15·71

Station.	For July, 1934.	Av'ge. for July.	Av'ge. Annual Rain-fall.
Lower North—*continued*.			
Brinkworth	1·23	1·72	15·83
Blyth	1·52	1·83	16·80
Clare	1·62	3·09	24·56
Mintaro	1·50	2·86	23·47
Watervale	2·18	3·15	26·91
Auburn	2·02	2·98	24·00
Hoyleton	1·43	1·94	17·35
Balaklava	1·03	1·68	15·49
Port Wakefield	1·03	1·35	12·96
Terowie	0·80	1·32	13·40
Yarcowie	0·88	1·40	13·63
Hallett	1·28	1·85	16·48
Mount Bryan	1·30	2·01	16·81
Kooringa	1·86	2·16	17·92
Farrell's Flat	1·43	2·15	18·68
West of Murray Range.			
Manoora	1·49	2·13	18·93
Saddleworth	1·00	2·26	19·61
Marrabel	2·10	2·31	19·94
Riverton	1·27	2·41	20·81
Tarlee	1·04	1·96	18·13
Stockport	1·14	1·82	16·97
Hamley Bridge	0·91	1·78	16·61
Kapunda	1·19	2·32	19·82
Freeling	1·19	2·00	17·88
Greenock	1·47	2·51	21·57
Truro	1·13	2·35	19·95
Stockwell	1·19	2·35	20·17
Nuriootpa	1·49	2·49	20·72
Angaston	1·89	2·71	22·47
Tanunda	1·76	2·63	22·03
Lyndoch	1·90	2·98	23·46
Williamstown	1·89	3·68	27·77
Adelaide Plains.			
Owen	0·72	1·76	14·53
Mallala	0·78	1·83	16·59
Roseworthy	1·41	1·95	17·39
Gawler	1·71	2·19	18·97
Two Wells	1·19	1·82	15·75
Virginia	0·99	1·95	17·18
Smithfield	1·56	1·98	17·65
Salisbury	1·20	2·10	18·59
Adelaide	1·04	2·65	21·15
Glen Osmond	1·32	3·40	26·03
Magill	1·21	3·17	25·60
Mount Lofty Ranges.			
Teatree Gully	1·80	3·20	27·33
Stirling West	2·69	6·28	47·05
Uraidla	2·83	5·96	44·19
Clarendon	1·77	4·27	32·89
Morphett Vale	1·14	2·92	22·68
Noarlunga	0·81	2·71	20·41
Willunga	1·23	3·63	26·03
Aldinga	0·80	2·72	20·28

RAINFALL—*continued.*

Station.	For July. 1934.	Av'ge. for July.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*			
Myponga	2·38	4·44	29·68
Normanville	1·15	2·95	20·73
Yankalilla	1·26	3·14	22·90
Mount Pleasant	2·00	3·58	27·24
Birdwood	1·86	3·89	29·24
Gumeracha	2·66	4·27	33·44
Millbrook Res.	2·41	4·53	34·82
Tweedvale	2·66	4·95	35·97
Woodside	1·63	4·33	32·30
Ambleside	1·75	4·70	34·90
Nairne	1·44	3·72	28·17
Mount Barker	1·54	4·25	31·97
Echunga	1·91	4·24	33·26
Macclesfield	1·69	4·05	30·44
Meadows	1·65	4·79	36·21
Strathalbyn	1·37	2·50	19·32
Murray Flats and Valley			
Meningie	0·84	2·38	18·42
Milang	1·16	1·81	14·97
Langhorne's Ck.	0·87	1·73	14·90
Wellington	0·77	1·49	14·70
Tailem Bend	1·20	1·50	15·08
Murray Bridge	0·85	1·37	13·64
Callington	0·76	1·75	15·22
Mannum	1·18	1·13	11·53
Palmer	1·16	1·74	15·55
Sedan	0·97	1·18	12·11
Swan Reach	1·12	0·90	10·62
Blanchetown	0·85	0·89	11·03
Eudunda	1·24	1·88	17·18
Sutherlands	0·87	1·02	10·88
Morgan	0·79	0·70	9·21
Waikerie	1·21	0·69	9·70
Overland Corner	0·65	0·77	10·37
Loxton	0·83	0·93	11·65
Berri	0·62	0·82	10·32
Renmark	0·52	0·78	10·49
West of Spencer's Gulf			
Eucla	1·12	0·87	9·98
Nullarbor	1·08	0·96	8·84
Fowler's Bay	1·88	1·72	11·93
Penong	1·25	1·72	12·23
Koonibba	0·83	1·66	12·11
Denial Bay	0·82	1·60	11·52
Ceduna	1·18	1·31	10·16
Smoky Bay	1·14	1·56	10·51
Wirrulla	0·81	1·40	10·50
Streaky Bay	2·59	2·33	14·88
Chandada	1·62	—	—
Minnipa	0·84	1·88	13·87
Kyancutta	1·25	—	—
Talia	0·81	2·31	14·63
Port Elliston	1·35	2·65	16·50
Yeelanna	0·93	2·58	16·02
Cummins	1·24	2·94	17·31
Port Lincoln	0·91	3·02	19·43
Tumby	0·71	1·99	14·14
Ungarra	1·03	2·48	16·87
Port Neill	0·42	1·56	13·16

Station.	For July, 1934.	Av'ge. for July.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—*continued.*			
Arno Bay	0·61	1·51	12·63
Rudall	0·57	1·74	13·12
Cleve	0·82	1·69	14·79
Cowell	0·30	1·04	11·12
Miltalie	1·01	1·37	13·64
Darke's Peak	1·09	1·82	15·23
Kimba	0·51	1·47	11·84
Yorke Peninsula.			
Wallaroo	0·97	1·58	13·99
Kadina	1·00	1·93	15·69
Moonta	1·48	1·84	15·10
Paskeville	1·38	1·88	15·52
Maitland	1·33	2·53	19·97
Ardrossan	0·64	1·56	13·98
Port Victoria	1·06	1·90	15·49
Curramulka	0·79	2·39	17·95
Minlaton	1·13	2·32	17·85
Port Vincent	0·79	1·73	14·50
Brentwood	1·14	2·07	15·58
Stansbury	1·02	2·20	16·84
Warooka	1·55	2·60	17·53
Yorketown	0·82	2·32	16·94
Edithburgh	1·16	2·15	16·49
South and South-East.			
Cape Borda	3·41	4·19	24·86
Kingscote	2·06	3·01	19·16
Penneshaw	1·50	3·02	19·02
Victor Harbour	1·25	2·96	21·42
Port Elliot	1·21	2·64	19·95
Goolwa	0·93	2·34	17·87
Copeville	0·63	0·94	11·57
Meribah	0·72	1·12	11·46
Alawoona	0·61	1·06	10·29
Mindarie	0·70	1·10	12·22
Sandalwood	0·64	1·31	13·73
Karoonda	0·51	1·30	14·48
Pinnaroo	0·88	1·34	14·57
Parilla	0·78	1·33	14·01
Lameroo	0·58	1·63	16·10
Parrakie	0·60	1·45	14·64
Geranium	0·44	1·76	16·53
Peake	0·54	1·64	16·13
Cooke's Plains	0·70	1·67	15·43
Coomandook	0·56	2·04	17·20
Coonalpyn	0·82	2·12	17·53
Tintinara	0·63	2·21	18·73
Keith	1·13	2·11	17·96
Bordertown	1·09	2·26	19·26
Wolseley	1·25	2·12	18·52
Frances	1·76	2·38	20·01
Naracoorte	1·91	2·79	22·63
Penola	2·23	3·29	26·05
Lucindale	2·36	3·28	23·29
Kingston	2·11	3·54	24·37
Robe	2·81	3·98	24·68
Beachport	2·46	4·47	27·07
Millicent	3·46	4·33	29·81
Kalangadoo	4·53	4·47	32·38
Mount Gambier	2·76	4·08	30·55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings. Aug.	Dates of Meetings. Sep.
Adelaide	*	—	—
Alawoona	*	—	—
Allandale East	117	24	21
Alma	*	—	—
Appila-Yarrowie	†	3	7
Arthurton	*	—	—
Ashbourne	†	22	19
Auburn Women's	*	31	--
Balaklava	†	27	23
Balhannah	†	—	—
Balumbah	*	—	—
Balhannah Women's	†	15	19
Balumbah Women's	†	1	5
Beetaloo Valley	†	20	17
Belalie Women's	142	14	11
Berri	†	22	26
Belvidere	*	—	—
Blackheath	†	30	27
Black Rock	†	—	—
Black Springs	†	21	2
Blackwood	*	13	10
Blyth	†	24	28
Booborowie	†	20	17
Booleroo Centre	*	24	21
Boolgun	*	—	—
Boor's Plains	†	2	6
Borrika	*	—	—
Bowhill	*	20	17
Brentwood	†	2	6
Brinkley	*	22	19
Brinkworth	*	20	17
Brownlow	122	—	—
Buchanan	†	—	—
Bute	†	16	20
Butler	†	—	—
Caliph	*	7	4
Caralue	*	22	19
Carrow	*	22	19
Ceduna	*	—	—
Charra	*	—	—
Cherry Gardens	130	25	—
Chilpuddie Rock	†	—	—
Clare Women's	142	—	1
Clarendon	*	20	17
Cleve	*	4	1
Collie	*	1	5
Coomandook	†	31	28
Coonawarra	*	23	20
Coonawarra Women's	†	15	19
Cummins	*	10	14
Cungena	*	2	6
Currency Creek	*	27	24
Dudley	*	—	—
Elbow Hill	125	23	20
Eudunda	*	6	3
Eurelia	*	11	8
Eurelia Women's	*	1	5
Farrell's Flat	*	31	28
Finnis	†	—	—
Frances	†	—	—
Frayville	†	23	20
Gawler River	*	—	—
Georgetown	*	25	22
Geranium	*	25	29
Gladstone	†	24	21
Gladstone Women's	†	21	18
Glencoe	*	14	11
Goode	†	—	—
Goode Women's	*	—	—
Greenock	*	—	—
Green Patch	125	23	20
Gumeracha	*	27	24
Hanson	*	21	18
Hartley	†	—	—
Hindmarsh Island	*	—	—
Hope Forest	131	6	3
Hope Forest (Wom's)	143	—	—
Hoyleton	*	20	17
Inman Valley	†	16	20
Jamestown	*	15	19
Jervois	*	9	13
Kalangadoo Women's	†	11	8
Kalangadoo	†	11	8
Kalyan	*	15	19
Kangarilla Women's	†	16	20
Kanni	*	—	—
Kapinnie	*	—	—
Kapunda	*	10	14
Karoonda	*	22	26
Keith	*	23	20
Kelly	127	4	1
Ki Ki	*	—	—
Kilkerran	†	23	20
Kongorong	*	20	17
Koolunga	*	—	—
Koonibba	*	23	20
Koonunga	†	—	—
Koppio	†	21	26
Kringin	*	27	24
Kuitpo	*	22	19
Kulkawirra	†	14	11
Kyancutta	†	7	4
Kybybolite	*	23	20
Kybybolite Women's	†	—	—
Lameroo	*	25	22
Langhorne's Creek	†	22	19
Laura	*	25	22
Laura Bay	†	—	—
Laura Bay Women's	†	—	—
Lensw'd & F'st Range	†	—	—
Light's Pass	*	—	—
Lipson	*	25	22
Lone Gum & Monash	†	22	19
Lone Pine	*	20	17
Lowbank	*	22	19
Loxton	*	10	14
Lyndoch	†	21	18
McLaren Flat	†	—	—
McLaren Flat Wm's	†	2	6
Macclesfield	†	16	20
MacGillivray	*	21	18
Mallala	*	20	17
Maltee	*	23	20
Mangalo	*	—	—
Mangalo Women's	144	8	12
Marama	†	—	—

INDEX TO BUREAU REPORTS—*continued.*

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying.	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

ALLANDALE EAST.

June 22nd.—Attendance, 14.

THE AGRICULTURAL BUREAU.—The Hon. Secretary (Mr. J. Laslett) read the following paper:—"It is just forty-seven years ago since the late Mr. Albert Molineux, when giving evidence before a 'Select Committee on Vegetable Products,' suggested the establishment of an Agricultural Bureau. In 1888 the Government adopted his suggestion, and at the end of that year there were established in the State 5 Branches with a membership of 53. From this humble beginning the Agricultural Bureau has grown to over 300 Branches with a membership of over 8,000. The primary object of the early Bureau was to collect and publish by means of the Press, information of every kind calculated to prove beneficial to the colonists engaged in agricultural, horticultural, pastoral, and other pursuits connected with the cultivation of the soil. This is still the main object of the Advisory Board of Agriculture, which controls the many Branches of the Agricultural Bureau throughout the State, but to-day we have a Department of Agriculture, with officers possessing special technical knowledge of certain branches of agriculture, besides experimental farms and similar institutions for research and investigation—advantages which the early Agricultural Bureau did not possess. The Bureau does not now solely depend on the Press for publication of material affecting its members. The *Journal of Agriculture* is issued monthly by the Department of Agriculture. It is the medium by which the Department gives publicity to the work done by its various Branches, and it is also the official organ of the Agricultural Bureau. At the meetings of local Branches members not only hear papers by their own members, but they also benefit by hearing lectures and addresses on agricultural subjects by men who have made a thorough study of their work, and who are at all times ready to assist the man on the land. Treatment for stock diseases, identification of weeds, &c., can be referred to authorities on these matters, and all the Bureau member has to do is to await the reply and act upon it. At District Conferences which are held at various centres throughout the State, and at the Annual Congress in Adelaide, representatives of Bureaus have an opportunity of hearing officers of the Department speak on selected subjects. Resolutions which had their origin in the small local Branch may be brought per medium of the Annual Congress before the proper

authorities, and matters affecting the whole State discussed. Members thus have, in the Advisory Board, a powerful agent working in their interests. Local Branches have been freely criticised. It has been said that Branch members do not practise what they preach. Perhaps this statement is true, but very often it is because members lack finance that their ideas are not carried out on the lines suggested. But papers given by members of one Branch are not intended for the benefit of that Branch only, and ideas brought forward may assist primary producers in other districts miles away from where the ideas originated. Apart from the social aspect, the effect of a few members meeting monthly together to discuss their problems and striving to find a solution for them must surely have an educational value. Let us then, as members, strive to do our part to ensure the smooth working of the Branch, by being punctual and exhibiting a keenness in the discussions brought forward, by contributing to the Agenda when our turn comes, by enlisting and encouraging new members, and thus ensuring to the coming generation the value of the Agricultural Bureau.''

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Penola	28/6/34	8	Debate	F. Hinze
Frances	11/7/34	11	Annual Meeting	E. Herold
Mount Gambier	13/7/34	14	Annual Meeting	G. Gurry

UPPER NORTH DISTRICT.
(PETERBOROUGH AND NORTHWARD.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Black Rock	12/6/34	9	Annual Meeting	R. Kitto
Warcowie	28/6/34	22	Address—C. A. Goddard	A. Crossman
Wilmington	10/7/34	15	Annual Meeting	C. Cole
Morchard	21/7/34	17	Lecture—Messrs. Bayly and Judell	E. Tillbrook

MIDDLE NORTH DISTRICT.
(PETERBOROUGH TO FARRELL'S FLAT.)
NELSHABY AGRICULTURAL BUREAU.

ANNUAL SEED WHEAT COMPETITION, 1934.

Judged by E. L. Orchard, R.D.A. (District Agricultural Instructor.)

The conduct of this Competition annually by the Nelshaby Branch of the Agricultural Bureau demonstrates in a practical manner the endeavour of members to encourage the sowing of a first class sample of seed throughout their immediate neighbourhood. This worthwhile phase of the work of the Branch has been carried on for a number of seasons, with definite benefit to the quality of grain reaped from the wheat fields of the district, and although there may be still room for improvement, particularly in the direction of the elimination of barley, the results indicate the wisdom of the committee of management in continuing the contests from year to year.

Competitions of this nature may not attract the attention of a number of growers in any one year, but the gradual leavening process which undoubtedly goes on, though slowly, nevertheless surely permeates the careless ''near enough'' attitude too often met with. Wheat-growing at the moment is at somewhat of a discount, due to the run of abnormally low prices constituting a value below that of the cost of production. However, the hope, not altogether without foundation, that prices cannot always remain at the present extremely low level prompts us to explore every available avenue likely to lead to increased yields to assist in making up the previous leeway, and to succeed in this laudable objective, one of the first essentials surely must be the sowing of the

best seed obtainable. Instances of the increased value accruing from the use of properly graded seed are so numerous as to destroy any lingering doubt regarding the results in pounds, shillings, and pence, whilst the sowing of varieties without an admixture of heads of other kinds brings a further reward as being true to type. Admitting the truth of the contention, that our present methods of marketing do not offer much inducement toward the complete elimination of other objectionable features from the shipments of wheat sent overseas, nevertheless the standing of an owner, together with his property, are enhanced by success in a competition of this kind, and has its reflection in many ways in local business dealings, even to the extent of a radiation of some of the warming rays of praise over the boundary fences.

This Competition was divided into two classes, a trophy being offered for the best collection of two varieties, and another for the champion variety of seed wheat, taken as the individual sample receiving the highest total of points. Samples of 2lbs. each in weight were tabled for judging, procured from five-bag quantities on the farms. In the class for two varieties, No. 3 entry made by Mr. F. Jose gained the highest number of points, the wheats presented being Nabawa and Quality, and their scoring 85.75 points and 94 points respectively, a total of 179.75 points. The sample of Quality, which did so much in winning the previous class for Mr. Jose, proved the champion variety, with its allocation of a total of 94 points.

No.	Name.	Variety.	a. 25	b. 15	c. 15	d. 20	e. 15	f. 10	Total Class 2. 100	Total Class 1. 200
1	T. Davies	Nabawa	19·75	12	14	17	12	8	82·75	169·75
		Currawa	21·5	13	13	19	13·5	7	87·00	
2	E. T. Franks	Currawa	22·5	12·5	14	20	14	6	89·00	178·25
		Nabawa	22·25	13	14	18	14	8	89·25	
3	F. Jose	Nabawa	19·75	12	14	20	13	7	85·75	179·75
		Quality	24·50	12	13	20	14·5	10	94·00	
4	H. G. Williams	Florence	24·25	12	13	16	14	8	87·25	
5	L. C. Roberts	Currawa	22·75	12	14	19	12·5	8	88·25	

a. Weight per bushel.
b. Plumpness and evenness of grains.
c. Freedom from visible admixture.
d. Freedom from bunt, weed seeds, etc.
e. Freedom from injury in harvesting.
f. Freedom from dirt, chaff, straw, etc.

Weight per bushel—25 points.

Varying from 59¼lbs. in two of the samples of Nabawa to 64lbs. for the exhibit of Quality, the average weight of all entries ran out at a shade over 61¼lbs. per bushel. The Florence was only a trifle behind the Quality in this regard, the entries of Currawa, consistently at midway, tipping the beam well above the general average, whilst the two light-weight submissions of Nabawa gave the impression of having been subjected to weather bleaching.

Plumpness and evenness of grains—15 points.

Noticeable variations in this respect occurred to a greater or less degree in all of the samples, though the general uniformity may be gauged by the average allocation of 12.3 points, an interesting factor being the varietal differences as between the group of Nabawa entries and of the collection of Currawa exhibits.

Freedom from visible admixture—15 points.

Although they may not be altogether definite proof of foreign grains, the presence of just occasional green kernels in the early wheats were viewed with suspicion, along with the one or two deeper coloured grains which showed up under close examination in others.

Freedom from bunt, weed seeds, &c.—20 points.

The samples right through displayed no sign of bunt either by sight or smell. Barley constituted the greatest menace in the way of weed seeds, one or two of the entries containing a number of barley seeds. Apart from these, a stray jack sharp and nancy were all that came under notice.

Freedom from injury in harvesting—15 points.

This was rather pronounced in some exhibits, more particularly with the bleached Nabawa grains.

Freedom from dirt, chaff straw, &c.—10 points.

There was little to complain of regarding dirt, but chaff and broken backbones were present in varying quantities in some of the samples.

BULK HANDLING.

[Paper contributed by Messrs. G. Freebairn and A. Dolling at the June meeting of the Snowtown Branch.]

The question of the introduction into Australia of some more economical system of handling wheat has come up for consideration from time to time for a number of years. It has become more urgent as the cost of cornsacks has increased and there has been a growing feeling that the absolute dependence of Australian farmers on the source of supply of sacks, principally India, is undesirable, apart from the matter of cost, and that sooner or later serious difficulty will be encountered if the supply should be interfered with for any reason.

Some years ago a system of bulk handling was introduced into New South Wales and this has been extended until most of the principal wheat growing centres are served by it. Bulk handling is not universally adopted in that State, however, and a proportion of the crop is still handled in bags but more silos are being constructed each year and only the smaller sidings are without bulk handling facilities.

So far as can be ascertained the system gives general satisfaction and while operating costs are met the conduct of the system has involved the New South Wales Government in some monetary loss in the past. The principal cause of the loss has been the high capital cost of installation; the New South Wales system has been modelled principally on American and Canadian lines and included substantial country silos and a terminal plant of considerable capacity at Sydney.

Several years ago a specially appointed committee closely enquired in the New South Wales bulk handling system on behalf of the Victorian Government but reported adversely on its introduction into their own State on account of the formidable outlay required.

The position in South Australia appeared even less favorable to the introduction of bulk handling on account of the smaller wheat yield than that in the Eastern States and the multiplicity of shipping ports.

The coming of the period of financial stringency resulted in the matter being shelved, apparently for an indefinite period, as the provision of the large sum of money required to inaugurate an effective bulk handling system seemed quite beyond the ability of any Government or private enterprise.

It has been left to the co-operative organisation in Western Australia, Western Farmers' Limited and the Western Australian Wheat Pool, to revive the matter and the results of their investigations and experiments have shown that an efficient scheme of handling can be economically conducted at most receiving centres.

There are two important factors which the Western Australian organisation apparently had regard to throughout; one is that wheat, being a low value commodity demands cheap means of handling and the other is that large terminal accommodation is not necessary, storage facilities being much cheaper to provide in the country than at shipping ports.

Experiments on a modified scale were conducted in Western Australia in 1931 and, aided by the knowledge gained thereby, it was decided to establish bulk depots at five points for the receival of wheat during the 1931/32 season. These depots proved very satisfactory.

Additional accommodation was provided for the 1932/33 season's harvest and the trials have been so satisfactory that a special company has been formed to install a comprehensive system to cover the main wheat producing areas in Western Australia and the constructional work is now in course of progress.

THE SYSTEM IN OPERATION IN WESTERN AUSTRALIA.

Ordinary wheat sheds are prepared for the reception of wheat in bulk by being strengthened by the introduction of additional posts and walled with galvanized iron or timber and sufficiently stayed. Concrete or wooden floors are also provided. To accommodate wheat received in excess of the shed capacity, temporary storage bins are constructed of timber and roofed with iron. These do not reach more than a few feet from the ground. Wheat for delivery in bulk is brought in by farmers either in bags, or box trucks, or wagons. Various devices are used for temporarily closing bags or they may be left unfastened.

After weighing over weighbridge the wheat is emptied into a bin or pit by the farmer who retains the bags for further use.

Elevators of a mobile and inexpensive type are used to move the wheat from the reception bin to the shed or direct into trucks as may be required. These elevators are also used for moving wheat from sheds to trucks.

Much of the rolling stock of the South Australian Railways could be adapted to the carriage of wheat in bulk without considerable expense. This applies especially to trucks on the broad guage lines.

It is probable that improved methods of transporting the wheat will be evolved both at the receiving depots and at shipping ports.

As far as costs are concerned, the experiments show that an appreciable saving can be effected under the system adopted in Western Australia. It is estimated that a saving of between twopence and threepence a bushel can be effected, calculating the cost of bags at recent values.

The inauguration has proved so popular amongs the farmers in Western Australia that the estimates of receivals were greatly exceeded, many farmers electing to cart their wheat past sidings where only bagged wheat was received in order to avail themselves of the bulk system. Some are said to have carted their grain as far as 30 miles to the bulk depot.

It will be realised that the provision of storage accommodation at shipping points is a most important factor in any bulk handling scheme. Suitable waterfront sites may be difficult to secure and will probably be costly to rent from the harbour authorities. If the proposed structures are to be high the cost of foundations necessary to support the very great weight would be considerable. In view of the extra despatch with which trucks could be loaded and unloaded, it is not considered that anything more than a reasonable reserve stock of wheat would be required at each port. The cost of making this provision should not be excessive.

The mobile elevators in use in Western Australia are capable of handling a ton of wheat per minute, the largest truck in use in South Australia could thus be loaded comfortably in one hour. The facility of transport thus achieved will be obvious.

Another point to be considered is shipping. Owing to the much more expeditious loading, shipowners are prepared to accept lower freights for bulk wheat, the time of loading is reduced to approximately one-sixth of that required under the bag system. The saving of freight would go far towards balancing the additional cost of handling the wheat between the point of delivery and ship's side.

Advantages of Bulk Handling.

1. Saving in cost of bags—at most one-third of the usual quantity would be required each year to transport the wheat from farm to siding—means can be devised to practically eliminate bags altogether. 2. Saving cost of sewing—twine and labour involved. 3. Independence of source of supply of sacks, *e.g.*, a strike of Indian jute workers or disorganisation of shipping. 4. Elimination of some af the present charges at receiving points, *e.g.*, provision of dunnage, curtains, &c. 5. Greater despatch at sidings through weighing in bulk and necessity of carrying wheat. 6. Elimination of waste at handling points, in railway trucks, &c. as is experienced at present. 7. Complete protection from damage by weather, mice, birds, &c. 8. Additional mobility gained by quicker loading and discharge of railway trucks. 9. Savings in overseas freight, at present 2s. 6d. per ton or approximately ¼d. per bushel. 10. Saving in labour costs at shipping ports. 11. Quicker loading of vessels.

There are certain points that should be particularly noted in regard to this question. 1. That it is not proposed that farmers should be compelled to utilise bulk facilities if provided, consequently any farmers who did not find it convenient or economical to deliver in bulk could adhere to the bag system. 2. There is a private concern willing to undertake the installation of a system of bulk handling at its own expense, therefore it is not necessary for any public money to be expended on the venture. 3. As public funds need not be involved there is no necessity for government control of the system. 4. Costs of handling under a bulk system controlled by private enterprise could not be excessive, they would have to be moderate to be competitive with present costs otherwise wheat would not be attracted to the scheme. 5. Buyers of Australian wheat in England and other countries are now prepared to pay as much for bulk as for bagged wheat, if there is any difference it is only very small, usually less than a farthing per bushel. 6. Australia is the only wheat exporting country of importance which has not adopted bulk shipment of wheat on a considerable scale. 7. Any scheme recommended for adoption in South Australia must take into account the different geographical conditions in South Australia and the Eastern States. A system that required costly terminal storage would be prohibitive here because of the many shipping ports used. For this reason the unorthodox system tried out in Western Australia is recommended for adoption in South Australia. Experience has proved that storage of wheat at many country receiving places is quite practicable under South Australian conditions; this point is important, and care should be taken to avoid comparison with North American conditions, which are very different from those in Australia because of the different climate which prevents the transport of wheat during certain parts of the year.

The Labour Position.

There has recently been some agitation on the part of the waterside workers at Port Adelaide and elsewhere against bulk handling because it would minimise the amount of labour required at shipping ports. While the feeling of the wharf labourers on this matter is appreciated, it cannot be conceded that because they may be adversely affected

that bulk handling should not be proceeded with. No such attitude has been adopted by labour interests in respect to mechanical handling of other commodities, such as coal, nor to the mechanisation of secondary industries generally, and farmers naturally ask why they should be selected to carry the whole burden of labour which has been rendered superfluous by the introduction of modern mechanical methods.

It is important that a too narrow view of this aspect of the bulk handling question should not be taken. The matter should be viewed from the broad aspect of the national welfare. The cost to the farmers of South Australia of the cornsacks required for a crop of forty to forty-five million bushels at recent prices will be something over £500,000. The greater part of this money goes out of Australia for cost of the sacks in India and shipping freight. It is estimated that if a complete bulk handling scheme were installed about £400,000 would be saved out of this cost. The whole of this money would remain in the State and would represent a saving to each of the 14,000 farmers in South Australia of nearly £30 on the average. This money would not be withdrawn from circulation, but would be spent by the farmers, much of it no doubt in labour for necessary repairs to farm improvements and so on, consequently the total amount of labour employed would be actually increased, although some would no doubt be diverted from the water-front into other channels. It should not be forgotten that a good deal of labour would be required for the erection and maintenance of bulk facilities in the country, and this would help to tide over the present period of acute unemployment.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Jamestown	11/6/34	19	Address—C. F. Anderson	B. Phillips
Mount Bryan ..	8/7/34	—	Discussion	A. Jefferies
Gladstone	6/7/34	18	Annual Meeting	M. Hoare
Gladstone	20/7/34	20	Address—J. B. Harris ...	M. Hoare
Beetaloo Valley	16/7/34	11	Annual Meeting	B. Giddings

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BROWNLOW

May 30th.—Attendance, 16.

Clearing New Land.—Mr. M. Steinborner delivered a lecture on this subject, in the course of which he stated June and July were the most suitable months for clearing land, mainly for the value of wood, especially posts. The simplest and quickest method of pulling scrub down was with 4 horses and a heavy wagon or trolley. The chain should be slung around the tree as high as possible, and it was advisable to have a light load on the wagon to prevent it from lifting off the ground. For trees that were too strong for that method there were various other horse-power machines and grubbing jacks. Mullenising was not essential because it only half did the job; the stumps that were still in the ground ruined implements and team, and there was the trouble and bother of cutting and burning the young shoots every year. The wood and posts should be cut as soon as possible; if it was allowed to dry first it was much more difficult to cut. The rubbish left over should be burnt. If mullenising was done, the land should be cropped the first two or three years in succession and the stubble burnt, thus destroying shoots, roots, and all other rubbish. If time permitted stones should be carted off before cropping. Holes and ridges could be levelled off with a heavy iron drag. The same applied to ground that had been grubbed. (Secretary, R. Steinborner, Neale's Flat.)

NANTAWARRA (Average annual rainfall, 10.29in.).

May 31st.—Attendance, 14.

Hand Feeding Livestock.—Mr. K. Young read the following paper:—"When hand feeding is spoken of it usually refers to sheep, young horses, or cattle. At present sheep seem to be hand fed on most farms, especially ewes and lambs, for in most cases there is a shortage of good feed to enable the ewes to keep in good condition to supply the lambs with milk. If lambs have a severe setback when young it spoils them for marketing. We feed with long hay, chaff, pure corn, or corn and chaff. As to which method is best, depends largely on the purpose for which the sheep are required.

To most farmers, wool is one object they have in view. For wool, I favour long hay, it has enough strength in it to keep the sheep in fair condition. To allow them to get too low in condition would probably make a break in the wool, and the sheep would be more subject to disease. For fattening, they need a food of a better quality, preferably good chaff. To feed on pure corn is extravagant. Sheep all go for the best and will leave the poorer food. One farmer last year cut some patches of charlock that grew in the crop, and is at present feeding it to his sheep. The sheep are doing well on it, and by cutting these patches for hay, has turned what would have been practically useless rubbish into a useful fodder. It is sound practice to have in reserve enough fodder to feed to the sheep if required. There are different methods of feeding sheep. Some of the more fortunate have self-feeders, but from these, the stronger sheep get first pick, which is a disadvantage to the weaker ones. Others feed on clean hard ground, but mainly for hay. Iron troughs too are used. Super bags cut open with a wire threaded through each side holding the edges of the bags off the ground about a foot also make a good feeder. In some districts an ensilage pit would be handy, but this hardly seems practical considering the amount of labour entailed for a small quantity of ensilage.''

Discussion.—Mr. H. Paterson said a number of kerosene tins when each cut in half lengthways and tacked to boards made a splendid feeder, the wind not disturbing the feed. He also gave an instance where one of his neighbours kept about 700 sheep fat on a bag of peas daily. Mr. L. Belling spoke of his experience with chaff in the fleece when feeding on chaff, and favoured barley hay for sheep, they ate it in preference to wheaten or oaten hay. Mr. W. Starkey had fed Meggits meal to mares and foals and was extremely pleased with results. Peas also were a good fodder for sheep, the vines making splendid feed when dry. Mr. F. F. Herbert had an experience with sheep on peas and was pleased with the feeding qualities in the vines. Mr. K. Young replied and said it was well to feed roughage with rich feed, and when hand feeding, to feed well away from the drinking water if possible. (Secretary, S. Herbert.)

1934 CALENDAR 1934

MAY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	●	30	31	..	..
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	●	28	29	30
...	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	...	...	...	...	...	...
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	●	27	28
29	30	31	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	●
26	27	28	29	30	31	...
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
●	24	25	26	27	28	29
30	...	...	...	...	...	...

OCTOBER

S	M	T	W	T		S
...		2	3	4	5	6
7		9	10	11	12	13
14	15	16	17	18	19	20
21	22	●	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	●	22	23	24
25	26	27	28	29	30	...
...	...	...	...	...	...	...

DECEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	●	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

UPPER WAKEFIELD.

May 24th.—Attendance, 17.

The evening took the form of debate, "Horses *versus* Tractor." After both parties had expressed their views on the subjects the adjudicator (Mr. A. J. Marron) gave his decision in favour of the team representing "Horses" by the small margin of half a point. Mr. C. F. Neumann (Hon. Secretary) congratulated the younger members of the Branch on their fine efforts as debaters.

Some of the Competitors in the Vine Section, Lower North Pruning Championships.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Light's Pass ...	25/6/34	29	"Care of Implements," G. Boehm	C. Verrall
Rosedale	25/6/34	25	Address—J. Ruediger ...	S. Sincock
Lyndoch	29/5/34	14	Conference Reports......	J. Hammatt
Lyndoch	26/6/34	14	Discussion	J. Hammatt
Black Springs ..	26/6/34	10	Address—W. C. Johnston	K. Dunn
Penwortham ...	23/5/34	19	Address—W. C. Johnston	A. Jenner
Penwortham ...	20/6/34	16	Address—R. Baker	A. Jenner
Buchanan	10/7/34	11	Question Box	L. Bell
Tarlee	10/7/34	50	Annual Social	N. Clarke
Sutherlands	5/7/34	27	Address—H. Michael ...	E. Schiller
Snowtown......	13/7/34	12	Annual Meeting	A. Hocking
Stockport	13/7/34	19	Address—B. Kelly	L. Klaffer
Truro..........	23/7/34	16	"Engines," H. Rosenzweig	L. Davis

YORKE PENINSULA DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Paskeville	26/6/34	7	Paper from *Journal*	J. Prouse
Brentwood	5/7/34	7	Annual Meeting	J. Boundy
South Kilkerran	26/6/34	7	Discussion	R. Hasting
Boor's Plains ..	5/7/34	15	Address—Mr. Snodgrass .	S. Chynoweth

WESTERN DISTRICT.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

May 29th.—Attendance, 15.

THE WORLD'S WHEAT POSITION.—Mr. G. Payne read a paper on this subject, and in the discussion that followed Mr. S. Wake said it was a pity farmers were holding up the export of wheat. Had there been a compulsory pool the whole of the wheat would have been shipped. They could not store wheat in South Australia like other parts of the world. Mr. W. T. Cooper thought tariffs the main trouble in regard to the wheat industry. France and Germany had put big duties on our wheat, and they had practically only one market left for wheat. Mr. John Rehn said it did not seem as though stored wheat was going to bring a big price. The Great War had made France and Germany think seriously of growing their own foodstuffs. The wheat position was in a very serious position at present. The old maxim of supply and demand was the main factor. He did not think huge surpluses of wheat existed. Mr. Bert Jacobs said farmers should organise and restrict areas sown to wheat. (Secretary, J. Wildman.)

GREEN PATCH (Average annual rainfall, 19.42in.).

May 24th.—Attendance, 8.

REGISTRATION OF EAR MARKS FOR SHEEP.—All sheepowners should study the new Brands Act which for the first time allows a registered ear mark. Mr. P. Sinclair stated that the whole of Eyre's Peninsula was taken as one district under the Act, and no two similar registered marks were allowed for the district, and as only one ear was allowed for the registered marking, viz., the near ear for ewes and off ear for male sheep, it would not be long before all the simple marks were taken. Any private marks or age marks could be used on the ear opposite the ear used for registered marks.

FOXES.—A discussion on their destruction was held. Rabbits' heads were considered a good bait, but it was thought by most members present that rabbit head was dangerous to the farm dogs as the fox often carried this bait some distance and left it uneaten. The most common bait used in this district was sheep's liver, the baits always being buried and the position marked with pegs. Mr. Bailey advised running a trail every three days, and using sheep's offal for a drag. Mr. Murray recommended a trail once a week using a scorched sheep's pelt for the drag. Mr. Bailey stated that baits not buried were generally picked up birds even at night time. He also stated that when foxes first came to this district they dug up and ate most of the young rabbit nests which were at that time only shallow. Now the rabbits did not nest shallow, but mostly in places where the fox could not dig out. He did not find that soda used with strychnine made any difference to the quick destruction of the fox. The dead fox when it took a bait was generally found up hill from where the bait was taken. Mr. P. Sinclair yarded his ewes and lambs every night in a small paddock having a foxproof fence of 6ft. netting. He had proved this a successful method of dealing with the fox question. (Secretary, C. Whillas.)

NUNJIKOMPITA, May 24th.

A paper entitled "Clydesdales" was read by a member:—"This breed of horses originated in Scotland, and is essentially a utility horse noted for his fine springy action and gay appearance, with a small lean head. The neck of a mare in good or show condition should show a distinct arch on the crest. Coming over sloping shoulders, this is one of the characteristics of this breed, *i.e.*, a long horse covering a lot of ground with a really short back. This type of horse is always well ribbed up, never slack across the loin, and seldom flat-ribbed, though age always brings the ribs flat in time. Coming over the rump there is a breed fault; the drop to the tail is a bit too steep. The legs are the most important part of a utility horse. The feet should be big, but keeping yearlings and two-year-olds shod to develop an excess of hoof is one of the mistakes of the stud masters of to-day. Fetlocks should be long and well sprung. Many of the very high class Clydesdales I have seen in Scotland would, in South Australia, be classed as 'down in the fetlocks.' Cannon bone should be long and fat, having a hard smooth feel, with joints between fetlock and cannon free from knots or lumpy feeling. Hair should be fine, long, and straight, and confined to the back of the leg, leaving the front with little more than the ordinary coat carries. Straight hocks without any tuft give an appearance of capped hock, which is a serious fault. This class of horse seldom has the appearance of pot-belly. A chest too broad is as bad as one too narrow, setting the legs too far out instead of being under his weight, generally giving a paddling action that tires the horse. Looking at the girth, it should be set well back from the arm; a horse girthing close up always has a tendency to girthgall. Clydesdales are becoming noted for their white markings, the tendency being to breed more and more white on

to them until it seems to be becoming a hall mark of high class to carry an excess of white. When buying or choosing a sire for service, do not have anything to do with a horse with a vicious temper, and treat a mare the same way, for nothing comes out surer than the disposition of the parents of the stock.''

On April 29th Mr. W. H. Brownrigg (District Instructor) delivered an address, ''Horses, Cattle, and Pigs.'' (Secretary, P. Luestner.)

On Mr. C. F. Jericho's Farm, at Butler, thousands of Seagulls completely wiped out an infestation of grasshoppers which had caused so much damage to wheat crops and pastures.

WALLALA.

May 9th.—Attendance, 7.

PRODUCER GAS.—The Hon. Secretary, Mr. C. Zippel, read the following paper:—''During recent years efforts have been made by farmers to reduce the cost of production in an endeavour to make wheatgrowing profitable. For the man with a tractor. the adoption of producer gas has proved a step in the right direction, and has enabled fuel costs to be considerably reduced. The Mallee districts where there is an abundance of wood, suitable for charcoal, afford excellent opportunities for reducing the costs by the use of producer gas for power purposes. It will be admitted that when using producer gas, the engine loses a slight percentage of power and is a little more inconvenient to operate, but it must also be taken into consideration that when one can operate the engine for much less than half the cost of when working on liquid fuel, the inconvenience can well be afforded. I have now had 18 months' experience with producer gas plants and find the chief factors towards the successful operation of these plants are the use of clean and not over-burnt charcoal, and secondly, thorough daily attention to the scrubbers. Care should be taken when burning charcoal (especially when using the pit method) to see that the wood is not burned too quickly; this will result in a very poor sample of charcoal. The kiln method is the best to obtain good clean charcoal. The scrubber of the producer can be considered as the part of the plant requiring the most attention, for unless the scrubber is thoroughly clean and filled to the correct levels it cannot give the best results. Trouble will occur by either causing loss of power or by allowing uncleaned gas to find its way into the cylinders of the engine and thereby causing damage to the cylinder walls and pistons. Throughout the year an account has been kept of the costs per acre of working a 2-ton tractor fitted with a gas producer, and are as follows:—Ploughing, 4d. per acre, using 12-furrow plough; cultivating, 2d. per acre, using 20 combine; combining, 3d. per acre, using 20 combine; reaping, 4d. per acre, using 8ft. header. *The Kiln Method of Burning Charcoal.*—Build a round stack of wood (preferably green) on the ground measuring about 9ft. in diameter. After making provision for the necessary ventilation cover the stack of wood thickly with leaves and earth. Light in the centre of the kiln, it will then take about 30 hours before the flames emerge from the vents, which are then closed down. The kiln is then left for about 70 or 80 hours to cool sufficiently before being opened up with safety. If not properly cooled down, there is the danger of the stack bursting into flame again as soon as the air is let in. A kiln of the abovementioned size usually produces from 12 to 15 bags of screened charcoal. I find that the same acreage can be obtained from 1 bag of good charcoal as from 1 tin benzine.''

SHEARING AND PREPARING THE CLIP.—Paper read by Mr. H. Brown:—''The two main points in blade shearing are holding the sheep in the right position and sharpening the shears. Sheep should always be handled carefully when shearing. On most farms—

with only a small flock—the rams are allowed with the flock all the year round and some of the ewes are in lamb at shearing time and if handled roughly there is a danger of losing the ewe as well as the lamb. Care should be taken when shearing around the udder to see that the teats are not cut. In preparing the clip for market the fleece should be thrown out on a large table, the back taken out, and a separate fleece made of it. The rest of the fleece should be skirted only lightly, the stained pieces removed from the legs and around the crutch. The sides and shoulders produce the best quality wool. On no account should the belly wool be put with the fleece. It is not necessary to keep each sex wool separate if the back is taken out. If the back is not taken out, the parcel offered is two different classes. By taking out the back which contains more sand than the sides the sand is not mixed among all the wool and it can be offered in a much more attractive lot."

THE SHEEP BLOWFLY.

[*Paper read by Mr. F. Parsons at the June meeting of the Kelly Branch.*]

The flies that are responsible for striking sheep are not native to Australia, but were imported accidentally during early settlement.

A fly passes through four stages—egg, larvae, pupa, and adult. Approximately 1,000 eggs will be laid by a female fly. These hatch out in 1 or 2 days. Certain species never lay eggs but deposit young, active maggots.

Blowfly larvae or maggots exist in two distinct kinds—smooth maggots and hairy maggots. These two types are important because they form a valuable means of controlling the pest. The smooth maggots belong to a primary species of fly and hairy to a secondary species. The head of the smooth maggot has a mouth on the underside of the head, and jaws can be extruded in the form of two parallel black hooks. These serve to tear food into small pieces, actual feeding is chiefly done by eating liquified food. The hairy maggots have a more superior method of progression and mouth hooks are pointed and stronger formed than smooth maggots.

Experiments conducted at Canberra have proved that the maggots of the primary fly are first deposited on the sheep or carrion. The secondary fly will not lay eggs

Crutched sheep—Correct way.

unless the sheep has been already struck with the primary fly. The hairy maggot is a natural enemy of the smooth maggot, and when full-grown will attack and eat it, thus diminishing flies capable of striking sheep.

However, the sheep is worse off than before, because hairy maggots are much more active and will burrow far deeper into the body of its host. In summer, the period from egg to adult may be as short as 10 days.

The fly may be divided into two classes—those that strike first, called primary flies, and those that do not strike until after the sheep has been struck, secondary flies. In the first division are the primary green blowfly, the large brown blowfly, and the Western Australian brown blowfly.

In the secondary division the most important is the secondary green blowfly, distinguished from the primary green fly by dark bands crossing the abdomen. Primary flies fly about 8 miles in 17 days, while secondary flies fly 10 miles in 12 days. The life of a fly is from 35 to 91 days.

Methods of Control.

Practical control may be divided into two divisions—the prevention of strike, and cure of sheep once struck. The prevention of strike can be helped by decreasing the number of flies. As maggots can obtain full development only by feeding on carrion and living animals, it follows that all carcasses should be burnt. If buried the hole should be deeper than 6ft., because primary maggots have been known to reach the surface from this depth.

Crutching has proved its value many times over. The reason for this can be seen when it is realised that the strongest sense the blowfly possesses is that of smell. Under favourable conditions the Council for Scientific and Industrial Research has shown that the blowfly will deposit eggs on saddle cloths and blankets. Jetting and dipping in certain instances have been most beneficial. In my opinion trapping is not very satisfactory.

Selecting Sheep Susceptible to Strike.

By far the best method to prevent fly attack is to breed or select sheep that are not susceptible. It has been proved at Canberra that flies do not strike sheep at random, but because of the development on the sheep of an area of susceptibility, or that liability to strike is fundamentally dependent upon some factor in the sheep itself. In New South Wales careful records were kept of sheep struck, and it was found that practically the same sheep were struck each season. After examining the conformation of these sheep it was found that the liability to strike was parallel to the degree of wrinkling around the crutch. Thus, sheep having wrinkles around the crutch should be avoided as much as possible.

Crutched sheep—Incorrect way.

Some figures published in New South Wales of a private property are interesting. A flock of 2,450 ewes was divided into three and classified as follows:—Flock A (relatively insusceptible), 1,121; flock B (moderately susceptible), 872; flock C (definitely susceptible), 457. The number struck were:—Flock A, 1 sheep in 21; flock B, 1 sheep in 6; flock C, 1 sheep in 2. Some sheep in C were struck as many as 20 times in one season.

The infolds of these wrinkles are essentially places wherein moisture from urine, sweat, and rain is retained. Bacterial decomposition of yolk, sweat and skin exudations are thereby favoured, and bacteria growing on such areas may cause a definite inflammatory condition of the skin. Such areas give off a smell which is naturally attractive to blowflies. Sheep which are narrow behind and have their hocks approaching each other, are more prone to be struck than are wide, open-hocked sheep.

Wool condition is also related to some extent, for, in general, the wool of susceptible sheep carries more condition. It might be thought that the wool would suffer if sheep were bred that are "fly proof," but the A division in the example given contained a larger percentage of top line wool than the others. The "susceptible" group's wool tended to be finer and more heavily conditioned, yet wool of this type is carried by a fair percentage of sheep which are not struck. With our own flock with lambs by a Merino ram, we had to get them in practically every day during October, 1931. After

introducing Corriedale rams and crutching in February we have had only about 6 cases since the 1933 shearing. The top of the ear of nearly every ewe that is struck is nipped off, and it is usually these sheep that are the most troublesome. When fit they are killed for rations. In our case the wool has deteriorated slightly, but we have better shaped lambs.

The mating of A class rams with A class ewes from the divisions in the table gave lambs that were much less susceptible to flies than lambs from either of the other divisions. The question might be asked if susceptible sheep are bred out of the flock, will not the fly strike the less susceptible ones? The answer, according to New South Wales experts is that certain conditions appear to be necessary for the development of maggots on sheep, and it is the presence or absence of these conditions which seem to determine whether fly strike will take place. These conditions are a factor of the individual sheep and are not influenced by the fact that other sheep are running with it. Keeping sheep yarded unnecessarily is to be avoided, and all yarding reduced to a minimum when flies are troublesome. Adequate water supplies should be available so that sheep do not have to wait about for a drink, and also plenty of shade provided so that sheep do not crowd together.

TREATMENT OF STRUCK SHEEP.

A sheep that has been struck can be detected by any of the following points:— Sheep wriggling tail and stamping hind feet, or bending head round and biting at flanks. Fly blown sheep generally walk at the end of the mob.

When caught, the wool should be shorn well away from the affected area, and as close as possible to the skin. All maggots should be scratched out, care being taken that they do not fall on any other part of the sheep.

The best and cheapest dressing for this district is sump oil and powdered sheep dip. The maggots can only take their food in a liquid form so that as the sheep dip remains on the wool for a long time, any future maggots stand a fair chance of being poisoned. The sump oil acts as a protective coating on the wound and counteracts the caustic action of the sheep dip.

The dressings recommended by the Council for Scientific and Industrial Research after much experience are:—(1) 5 per cent. solution of zinc sulphate. (2) 5 per cent. watery solution of Monsol. (3) 4 per cent. phenol (carbolic) crystal in whale oil.

If plain-bodied sheep are kept and crutched during summer, very little trouble should be experienced in this district.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Miltalie	26/5/34	20	"The Wheat Industry G. Payne	G. Smith
Cummins	8/6/34	13	"Problems of the Farmer," H. Roberts	K. Trigg
Kyancutta	5/6/34	11	Discussion	E. Kelly
Kyancutta	3/7/34	14	"Horses' Feet," E. Dyke	E. Kelly
Goode	27/6/34	16	Discussion	B. Linke
Pygery	26/6/34	7	Discussion	A. Day
Pinbong	8/4/34	—	Social	C. Scholz
Pinbong	26/5/34	11	Discussion	C. Scholz
Koppio	27/6/34	9	Paper from *Journal*	M. Gardner
Chilpuddie Rock	27/6/34	10	Discussion	H. Brown
Laura Bay	10/7/34	17	Annual Meeting	P. Morrison

EASTERN DISTRICT.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

May 19th.—Attendance, 26.

RABBIT DESTRUCTION.—Mr. H. B. White read the following paper:—"No matter what kind of rural production a person may take up, he will find that there is usually some pest that has to be dealt with. The horticulturalist has to contend with birds and insect and fungus parasites. The beekeeper has to guard against ants, waxmoths, &c., but to the farmer and the pastoralist the worst pest is the rabbit. This animal is not a native of Australia but was introduced from England by early settlers. The rabbit found our land very much to his liking and within a short period spread over the whole

of the country in such numbers as to constitute a menace. Considerable damage can be done by rabbits where they are plentiful. They nip off acres of wheat or other cereals if allowed to thrive in close proximity to a crop. After the crop is ripe they continue their work of destruction by nipping through the stalks and allowing the head to fall on the ground. On grass land they destroy much good feed. It is claimed that 8 rabbits will consume as much feed as 1 sheep, so that the extent of the loss that a landholder may incur through rabbits decreasing the carrying capacity of his paddocks is quite obvious. It is therefore in his own interests that the landholder should do something every year to keep this pest in check. In most ills prevention is better than cure, and this applies to rabbits, for a farmer can save himself much trouble if he clears all his patches of scrub. This may not be practical in some of the rocky country that is found in this district, but in sandy land I consider that this is best. Where scrub is left on sand ridges, the edges of it soon become banked with drift sand and thus form an ideal place for rabbits to make their warrens. Most scrub land is infested with rabbits, and their warrens are numerous, but as soon as the scrub is properly cleared away, and the warrens ploughed in (with a tractor for preference) no more trouble is experienced with them. Various methods are adopted for the destruction of rabbits, such as fumigating the burrows with cyanide gas and laying poison, but the cheapest and perhaps most effective method is to place poisoned oats about in infested country. Rabbits are very partial to oats, and if treated for several days with unpoisoned oats will take to the poisoned ones quite readily. This work can only be carried out effectively when all natural grasses are dry. Care must also be taken to see that no farm stock is about, otherwise they may become poisoned also. After the poisoned oats have been out for several days they should be collected and destroyed. This is an easy matter if they are put out in small heaps of a handful and the locations of each heap marked with a stroke on the ground. To poison the oats, put them in a solution made of strychnine and water and heat to almost boiling point. In this way the oats become thoroughly saturated. When there is plenty of greenfeed about I consider the most effective way to destroy rabbits is to trap them and then dig in their warrens. This method has this advantage, viz., you can collect the skins, and by selling them reimburse yourself to some degree for the trouble you have been put to.'' (Secretary, C. Altmann.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Renmark	25/6/34	—	Address—" Sultana Types," K. Hocking	V. Prider
Taplan	13/6/34	20	" Soils and Manuring," A. Jenkins	P. Hodge
Kulkawirra.....	10/7/34	6	Annual Meeting	H. Elliott
Berri	17/7/34	—	Annual Meeting	E. Johnston
Nunkeri........	18/7/34	8	" Pruning," H. Sanders .	E. Peltz

SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

May 26th.—Attendance, 11.

Poultry Keeping, with Special Reference to the Black Orpington.—Paper read by Mr. J. Stone:—''Assuming that we have a place suitable to house the birds, the next thing is to determine in what manner we will proceed in securing a flock. Possibly it will be decided to go to a reputable breeder and procure a pen of birds for breeding—a cockerel and six hens—of a good strain. On the other hand, chicks of a first class strain may be purchased. This is cheaper in initial outlay, but by the time the birds come to laying eggs, will have cost a fair amount, and possibly some chicks have died, thus adding to the cost. Any young cockerels will be ready for market at about six months old. If rearing a flock, there will be a wait of 12 months from when the pullets start to lay before they can be used as breeders, also a cockerel will have to be purchased; breeding from closely related birds is not an amateur's job. Breeding from pullets means deterioration. The eggs are small both in size and numbers, and birds have far less vitality. The best proposition is to buy a pen of good birds and rear from them. It will be found necessary to have them mated three weeks before starting to keep eggs for incubation. For the first year procure broody hens for hatching purposes, because by the time there are enough eggs for an incubator some of them will be too stale. It is not advisable to incubate an egg over seven days old;

the strongest chickens are hatched from the freshest eggs. At the mating period give the birds a little extra attention and see that they have all that is required to give them plenty of vitality and ensure strong healthy stock. When the chicks are hatched, do not be over anxious to feed them until they are from 36 to 48 hours old and then start them with finely broken shell grit. Then give any of the proprietary foodstuffs which are all good for about a week, then they can be fed finely cracked wheat and finely chopped greenfeed. Gradually as they grow older bring them to the ordinary foods at about two months old. It will be found best to keep the chicks from the rest of the flocks, as sometimes older birds appear careless to chicks and injure and kill them. Any chicks that are not strong and healthy are not worth bothering with; even should they live, they are only weaklings all their life, and are not payable. When the chicks are old enough to define the sexes, separate the cockerels from the pullets. Keep the young birds in warm houses to which is attached a small run so that they may have all the sun and exercise they require in good weather, but if wet, keep them in the house with plenty of straw on the floor for scratching. In this manner keep them well exercised while still young, so that the birds will develop fully. As the cockerels approach the age of four or five months pick out the most forward birds and put them in a fattening pen, where they can be topped up for market in about three weeks. This pen is quite small, being only large enough to hold about a dozen birds, with very little room to move about, but to keep quiet and put on all possible weight in a short period. A pen for fattening must necessarily be warrm in winter and cool in summer, and on no account must it be draughty. Make the back and one side of wood, leaving the front and one side to be wire-netted, over which a shutter can be used as found necessary. The roof should be of some waterproof material, the floor of wire-netting of small mesh and heavy gauge. A tin used as a tray is placed under the netting to catch all droppings, which should be cleaned away daily. All food fed to birds for fattening in a pen is in liquid form, and given quite fresh. No water is used separate from that used in making the food liquid. Old birds that are discarded as layers will be quite palatable if finished off for market in this manner. As in the case of young birds for fattening, a change in the food should take about a week; if done suddenly, ill-effects will result. Black Orpington pullets usually lay their first eggs at from five to six months of age. These eggs are usually small for a start, but from a month to six weeks after the eggs are of a marketable size. We find Black Orpingtons the best winter layers. After a hen has had two laying seasons, it is only in rare cases that she is worth keeping longer.'' (Secretary, R. Stone.)

HOPE FOREST.

June 4th.—Attendance, 13.

Mr. W. J. Wilson, manager of the Kuitpo Hardwood Mills, in the course of an address said the most popular hardwoods in South Australia were pink and blue gum and stringy bark. Stringy bark was used mostly for sheds, posts, sheep runs, and water wells, because it was cheaper than other timbers. Thousands of feet of pink and blue gum were used for railway sleepers. Blue gum was the best timber for wells, mainly because it did not stain the water. He also specified stringy bark for posts in swampy land, stating that it would last 14 to 15 years, where other timber would rot away at ground level in 5 years. Within the next 10 to 12 years he believed there would be a shortage of hardwoods in South Australia. (Secretary, R. Coad.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Cherry Gardens	23/6/34	12	Annual Meeting	A. Stone
Yundi	28/6/34	—	Address—R. E. Giles ...	F. Smart
Lenswood and Forest Range	25/6/34	8	Annual meeting	B. Lawrance
Langhorne's Crk.	27/6/34	8	Lecture and Demonstration—H. H. Orchard	P. Nurse
Blackheath	28/6/34	9	"Side Lines," H. Paech .	E. Paech
Finniss	2/7/34	8	Annual Meeting	L. Dunn
McLaren Flat...	12/7/34	27	"Pruning," H. H. Orchard	P. Wait
Macclesfield	19/7/34	14	"Fodder Conservation," Mr. Fry	H. Ross
Balhannah	20/7/34	21	Annual Meeting	C. Grasby

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

GOOD THINGS FROM THE OVEN.

[By GRACE B. ARMSTRONG, A. MARIE SCHRIEBER, and MARY A. MCPHEE, of the University of Illinois, Urbana, U.S.A.]

(*Continued from page* 1641.)

WAYS OF USING DRY CAKE.

CAKE SERVED WITH SAUCE.

Cut the cake in pieces the proper size for one serving. Quickly dip each piece in cold water. Place on baking pan 2 inches apart. Put into hot oven for a few minutes until the cake has freshened, or put the dry pieces of cake on a plate in a steamer and steam until soft. Serve with lemon or chocolate sauce.

PUDDING MADE FROM CAKE.

Equipment.

1 mixing bowl	2 teaspoons
1 saucepan	1 tablespoon
1 measuring cup	1 baking dish
1 egg beater	

Materials.

2 c. stale cake crumbs	2 eggs
½ c. stale bread crumbs	½ t. salt
1 qt. scalded milk	1 t. vanilla
2-4 Tb. sugar	½ c. raisins or currants
2 Tb. melted butter	¼ c. nuts may be added

(The amount of sugar, butter, and flavouring used will depend on kind of cake.)

Amount: 8 large servings.

Method.

How.	*Why.*
Scald milk	Crumbs will absorb hot milk more quickly and thoroughly than cold milk.
Soak bread and cake crumbs in milk.	The more thoroughly the crumbs absorb the milk the more perfectly they can be mixed with the other ingredients.
Add sugar, butter, slightly beaten eggs, salt, and flavouring.	
Add raisins and nuts	If plain cake is used, raisins and nuts may be added at the last.
Bake 1 hour in buttered baking dish in slow oven (300°F.).	This pudding requires the same care in baking as does a custard.
Serve with lemon or hard sauce.	

QUICK BREADS.

In making quick breads, different proportions of flour and liquid are used. Typical proportions are illustrated in the following:—

Batters: (1) Pour batter—1 c. liquid to 1 c. flour (popovers)
(2) Drop batter—1 c. liquid to 2 c. flour (muffins)

Doughs: (1) Soft dough—1 c. liquid to 3 c. flour (cake)
(2) Stiff dough—1 c. liquid to 4 c. flour (pastry or yeast bread)

Muffins, baking-powder biscuits, griddle cakes, and popovers are representative of the various types of quick breads. In making them we learn the fundamental principles of making all quick breads. Variations of these recipes emphasize these principles and give some additional processes.

MUFFINS.

Equipment.

1 measuring cup	1 mixing bowl
1 teaspoon	1 strainer
1 tablespoon	Muffin pans
1 flour sifter	

Materials.

2 c. flour	1 egg
3½ t. baking powder	1 c. milk
½ t. salt	2 Tb. melted shortening
2 Tb. sugar	

Amount: 12 muffins.

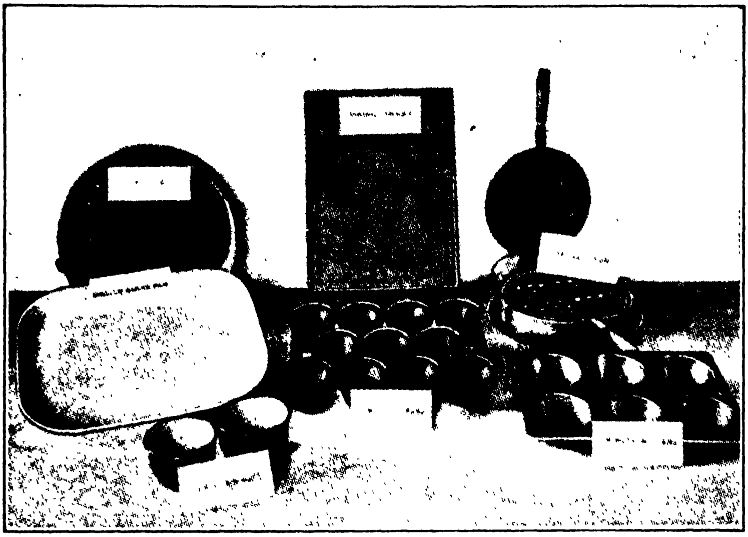


Fig. 6.—Utensils for baking some of the Quick Breads.

Method.

How.	*Why.*
Sift dry ingredients together.	Sifting the ingredients mixes them evenly.
Beat egg.	Beating breaks up the yolk and white so that the egg can be more evenly distributed. Egg is used here for a binding substance.
Add milk to egg.	The small amount of egg can be more evenly mixed if it is put in with the milk.
Gradually stir milk and egg into dry ingredients.	If the milk and egg are stirred in gradually, the mixture will not lump so easily.
Stir until mixture is free from lumps.	Stirring removes lumps and gives a finer and more even texture to finished product.
Add melted fat and beat about ½ minute.	Melted fat can be more evenly distributed than cold fat, but care should be taken not to brown the fat in heating.
Fill the greased muffin pans half full of mixture and bake in hot oven (410°F.) about 25 minutes.	Filling the cups only half full gives the muffins room to rise.
If there is not enough of the mixture for all the cups, partially fill empty ones with water.	Water prevents heat from injuring pan.

VARIATIONS OF MUFFINS.

Corn Meal or Graham Muffins.—Use same recipe as for plain muffins, substituting 1 cup of either corn meal or graham flour for 1 cup of white flour.

Sour Milk Muffins.—Sour milk or buttermilk may be used in place of sweet milk, with only a slight change of recipe. Follow the above recipe, using 1 cup of sour milk instead of 1 cup of sweet milk. Use 1½ instead of 3½ teaspoons of baking powder, and add ½ teaspoon of soda to neutralize the acid in the sour milk. (In any recipe calling for sweet milk and baking powder, sour milk may be substituted if soda is added. Use ½ teaspoon of soda for each cup of sour milk and subtract 2 teaspoons of baking powder from the amount called for in the recipe for each ½ teaspoon of soda used.)

Dried Fruit Muffins.—Add ½ to ¾ cup of currants, chopped raisins, or dates to the batter. Save out a little flour from the amount called for to mix with the fruit. This keeps the fruit from sinking to the bottom of the pan.

Fig. 7.—Graham Muffins.

Blueberry Muffins.—Use only ¾ cup of milk and add 1 cup of blueberries. Save out ¼ cup of flour from the amount called for to mix with the berries before they are added at the last. Flour is mixed with the berries to keep them from sinking to the bottom of the pan.

BAKING-POWDER BISCUITS.

Equipment.

1 mixing bowl	1 tablespoon
2 knives or 1 fork	1 flour sifter
1 biscuit cutter	1 breadboard
1 teaspoon	1 rolling pin
1 measuring cup	Baking pans

Materials.

2 c. flour	2 Tb. shortening
4 t. baking powder	½ to ¾ c. milk
½ t. salt	

Amount: 15 small biscuits.

Method.

How.	*Why.*
Sift dry ingredients together into bowl.	The baking powder and salt are thus evenly distributed throughout the flour.
Cut shortening into dry ingredients, using either a fork or 2 knives, until mixture is like coarse meal. One can work in shortening with tips of fingers.	A knife or fork keeps the mixture colder. If the hands are used, only the very tips of the fingers should be used and the mixture should be handled as little, as lightly, and as quickly as possible.
Push flour to one side of bowl; turn in a little milk and toss flour and milk together lightly with a fork until mixture is a soft dough. Continue adding milk gradually until mixture is a soft, spongy dough.	Some flours take up more moisture than others, so entire amount of milk called for may not be needed.
Turn on to slightly floured board, knead ½ minute, pat and roll very lightly to ¾in. thickness.	If mixture is handled roughly or rolled hard, the air bubbles are broken and the biscuits will not be light or fluffy. Excessive rolling and mixing develops gluten and so makes biscuits tough.
Dip biscuit cutter in flour and cut dough into biscuits, wasting as little of dough as possible.	Flouring cutter prevents dough from sticking to it. Pieces left after cutting are never so tender when worked over a second time.
Bake in very hot oven (450°F.) 12 to 15 minutes.	

Fig. 8.—Baking Powder Biscuits.

VARIATIONS OF BISCUITS.

Emergency Biscuits.—These biscuits are made according to the above recipe except that about ¼ cup more milk is used and the mixture is dropped from a spoon directly upon the oiled baking pan without rolling.

Pin Wheel Biscuits.—Use same equipment as for baking-powder biscuits except for addition of knife or food chopper.

Materials.

Baking-powder biscuit dough	2 Tb. sugar
½ c. chopped raisins or currants	2 Tb. melted butter
½ t. cinnamon	

Roll dough about $\frac{1}{3}$in. thick and spread with melted butter. Mix cinnamon with sugar, and dust on dough. Scatter currants or raisins on the dough and roll it up as for jelly roll. Pinch edges together so fruit will not fall out, and cut in slices about 1in. thick. Place slices on oiled pan and bake about 15 minutes in hot oven (425°F.). Watch the biscuits carefully, as the sugar makes them burn easily on the bottom.

Roly Poly.—

Materials.

Baking-powder biscuit dough	$\frac{1}{3}$ t. cinnamon
2 large apples, sliced	1 Tb. butter
$\frac{1}{4}$ c. sugar	

Use recipe for baking-powder biscuits, but use 3 tablespoons of shortening instead of 2 to make product richer and more suitable for dessert. Roll dough into an oblong shape $\frac{1}{4}$in. thick; spread first with softened butter and then with sliced apples, keeping apples about $\frac{1}{2}$in. from edge. Mix cinnamon and sugar, and sprinkle over apples. Roll up like jelly roll. Place roll on greased pan and bake in hot oven (425° F.) about 25 minutes, or until apples are tender. Other fruits may be substituted for the apples. Serve hot with sugar and cream, or pudding sauce.

Fruit Dumplings.—Use same recipe as for roly poly, that is, a baking-powder biscuit dough which has had an extra tablespoon of shortening added. Roll $\frac{1}{4}$in. thick, and cut in 5 or 6 equal portions, the size being determined by size

Fig. 9.—Pin Wheel Biscuits.

of fruit to be used. Place in the centre the apple or other fruit, pared, cored, either sliced or whole, and sprinkle with sugar and cinnamon. Moisten edges of dough with cold water and fold neatly together about the fruit. Bake or steam until fruit is tender. If cored apples are used whole, the centre may be filled with raisins or nuts, or sugar and cinnamon; or filling may be omitted. Brushing the outside of the dumpling with melted butter and sugar or with a little beaten egg before baking, gives a brown, glazed surface. Serve with pudding sauce, or sugar and cream.

Dutch Apple Cake.—Use same recipe and materials as for roly poly but roll dough a little thicker—about $\frac{1}{2}$in.—and place flat upon greased pan. Spread melted butter or other shortening on dough, and press sliced apples into dough in rows, with sharp edge of sliced apple downward, until top of dough is covered with apples. Mix cinnamon and sugar and spread over top. Bake in hot oven (425° F.) for about 30 minutes. Peaches or other fruits may be used in place of apples. Serve with sugar and cream, or pudding sauce.

Shortcake.—Use same recipe as for baking-powder biscuits, but use twice as much shortening to make product richer and more suitable for dessert. This means that 2 tablespoons of shortening are used for each cup of flour. The dough may be cut and baked in biscuit shape, or it may be baked in one large piece. If baked in large piece, it should be split with a fork after baking; cutting the hot product with a knife tends to make it heavy. Spread layers with melted butter and put sweetened fruit between layers and on top. Strawberries are always the favourite fruit, although raspberries, cherries, stewed dried apricots, oranges, or bananas may be used successfully. The top may be spread with whipped cream if desired.

GRIDDLE CAKES.

Equipment.

1 spatula or pancake turner	1 tablespoon
1 measuring cup	1 mixing bowl
1 teaspoon	1 small bowl
1 flour sifter	Griddle

Materials.

2 c. flour	1 egg
½ t. salt	1½ c. milk
3½ t. baking powder	2 Tb. shortening

Amount: 14 cakes about 4in. in diameter.

Method.

How.	*Why.*
Heat griddle.	A hot griddle forms a tender crust, searing the cakes and expanding the product before the gas bubbles can escape.
Sift dry ingredients together into mixing bowl.	This distributes the baking powder and salt evenly through the flour.
Beat egg in small bowl and add milk.	Mixing the egg with milk distributes it evenly through the mixture.
Pour milk and egg gradually on to dry ingredients, beating only until thoroughly mixed.	Beating gives the mixture a finer texture, but prolonged beating after the baking powder is added makes the cakes heavy and tough.
Add melted fat and beat again. Grease griddle lightly.	Melting the butter distributes the fat.

To bake, pour on hot, greased griddle. When cake is puffed full of bubbles and is brown on underside, turn and brown on other side. (Place on hot plate and serve at once.)

If large bubbles rise at once to the top of the cake, the griddle is too hot; and if the top of the cake stiffens before the underside is brown, the griddle is not hot enough.

Never turn a cake twice, for that makes it tough.

An aluminum griddle need not be greased.

VARIATIONS OF GRIDDLE CAKES.

Sour Milk Griddle Cakes.—Sour milk may be substituted for sweet milk in the above recipe. For proportions of baking powder and soda, see note under "Sour Milk Muffins."

Corn Meal Griddle Cakes.—Use same equipment as for griddle cakes except for addition of double boiler.

Materials.

½ c. corn meal	½ t. salt
2 c. scalded milk	1½ t. baking powder
½ c. flour	1 Tb. sugar
1 egg	1 Tb. shortening

Amount: 15 cakes about 4in. in diameter.

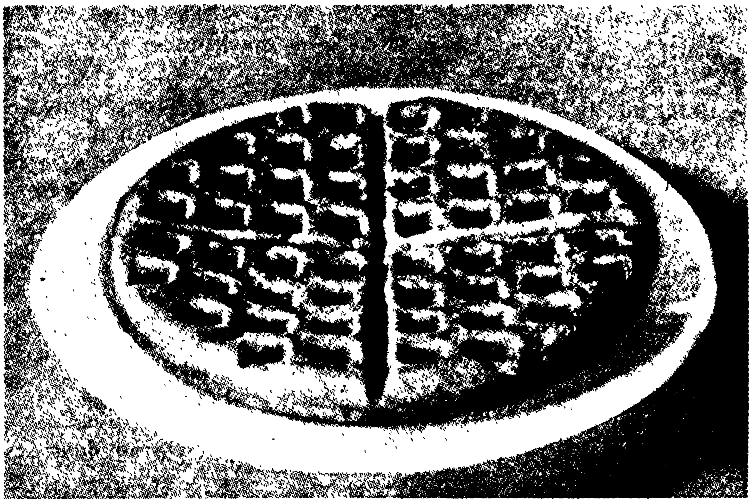


Fig. 10.—Waffles.

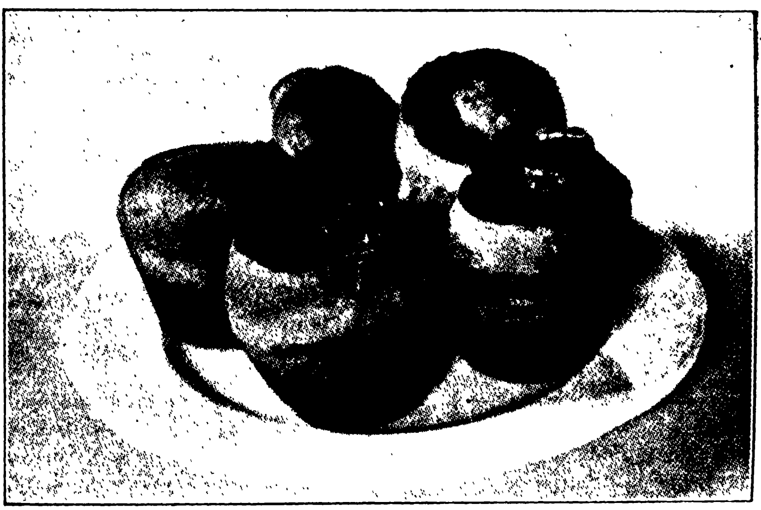


Fig. 11.—Popovers.

Method.

How.	*Why.*
Pour scalded milk over corn meal and stir well. Cook for 15 minutes in top of double boiler.	Being granular, corn meal needs longer cooking. This makes it more palatable and digestible.
Mix as for griddle cakes.	The same principles are involved as in making plain griddle cakes.
Cool slightly before adding beaten egg.	Mixture is cooled to prevent coagulation of egg.

Bake as griddle cakes. Care is required to turn these cakes without breaking.

Waffles.—Use same equipment as for griddle cakes, except substitute waffle iron for griddle and pancake turner. A pitcher from which to pour batter is a convenience.

Materials.

2 c. flour	2 eggs
2 t. baking powder	1½ c. milk
½ t. salt	2 Tb. melted shortening

Amount: 4 waffles 8in. in diameter.

Method.

Mix according to directions for plain griddle cakes. A lighter product will be obtained if yolks and whites of eggs are beaten separately and the stiffly beaten whites cut and folded in at the last. Beaten eggs act as a leavening agent; hence less baking powder is needed. Thoroughly heat the waffle iron. Grease it unless an aluminum or electric iron is used. Pour batter in centre and the mixture will spread to fill the iron. Brown waffle on both sides.

POPOVERS.

Equipment.

1 measuring cup	1 teaspoon
1 flour sifter	1 mixing bowl
1 Dover egg beater	Popover pans

Materials.

1 egg	1 c. bread flour
1 c. milk	¼ t. salt

Amount: 8 popovers.

Method.

How.	*Why.*
Use heavy earthenware cups, or iron or cast aluminum popover pans; agateware may also be used. Grease cup, using soft paper, cloth, or pastry brush.	A heavy material maintains more uniform temperature and forms better crust. Greasing prevents popovers from sticking to pans.
Start heating pans.	Pans should be hot enough to form a crust as soon as popovers are put into them.
Break egg into bowl and beat with Dover egg beater.	Egg is used here as a binding substance. A Dover egg beater beats more quickly than a fork or spoon and mixes the white and yolk more thoroughly.
Add milk and beat again.	Beating mixes the milk and egg so that the egg will be distributed evenly.
Add sifted flour and salt, and beat thoroughly several minutes.	Mixture is beaten well in order to remove lumps, and to make it smooth, thus giving a finer texture to the finished product.
Pour into hot, greased pans, filling them ½ to ⅔ full.	Room must be left in pans so that popovers can rise without running over.
Bake in hot oven (425°F.) at least 35 to 40 minutes.	A hot oven is needed to expand liquid quickly into steam and to form a crust which will keep its shape.
Do not open oven door for first 15 minutes.	If cold air strikes mixture before crust is set, the steam on the inside condenses and popovers will fall.

CREAM PUFFS.

Cream puffs are a variation of popovers.

Equipment.

1 measuring cup
1 mixing spoon
1 saucepan
1 sharp knife
Baking pans

Materials.

1 c. boiling water
½ c. butter
3 eggs
1 c. flour

Amount: 12 small or 9 large cream puffs.

Method.

How.	*Why.*
Heat the oven.	This mixture should begin baking as soon as it is placed in the oven.
Put butter and water in saucepan and bring to boiling point.	Fat melted in water tends to prevent lumping when flour is stirred into boiling water.
When boiling, add all the flour at once; stir vigorously until smooth.	The motion of rapidly boiling water and melted fat prevents lumping, while the heat cooks the mixture quickly. A stiff mass results that will stir together into a pasty lump.
Remove from fire as soon as mixture leaves sides of pan, and cool slightly.	The mixture is very thick and will burn quickly. It must be cooled slightly before stirring in the eggs to prevent the eggs from coagulating.
Add unbeaten eggs one at a time, beating mixture thoroughly after each egg is added.	It is necessary to beat the mixture to mix it thoroughly with the egg. Air and steam are the only leavening agents used.
Drop from spoon on to greased sheet, spacing drops 1½in. apart. Shape with spoon until circular, piling mixture slightly in centre.	Shaping the mixture will give it a rounded form rather than a flat one and will make it suitable for filling.
Bake 30 minutes in moderate oven (375°F.).	A hot oven would toughen an egg mixture.
Be careful not to remove puffs before they are done. If not sure whether they are done, remove one from the oven and see if it holds its shape.	Puffs will lose their shape if removed from oven before thoroughly baked.
Make a slit in top of each puff and fill with cream filling.	

(CREAM PUFF FILLING.)

Equipment.

1 measuring cup
1 tablespoon
1 mixing bowl
1 teaspoon
1 double boiler

Materials.

¾ c. sugar
6 Tb. flour
⅛ t. salt
2 eggs
2 c. scalded milk
1 t. vanilla

Amount: Enough to fill 12 small or 9 large cream puffs.

Method.

Scald milk. Mix sugar, flour, and salt; add gradually to hot milk, stirring constantly. Cook in double boiler for 15 minutes, stirring occasionally. Beat eggs slightly. Slowly pour several tablespoons of hot mixture on to beaten eggs and stir well. Add egg mixture to thickened milk while stirring. Cook 3 to 5 minutes, or until egg yolk has thickened. Add flavouring at the last.

[*To be continued.*]

Next month's issue will deal with Miscellaneous Quick Breads and Cakes.

BELALIE (Average annual rainfall, 17.71in.).

June 19th.—Attendance, 60.

A large attendance helped to make the June meeting a success. The meeting took the form of an Exhibition of Curios and Competitions in Jams and Knitted Jumpers. Among the curios were a handsome silver samovar, an antique bronze urn, a quaint musical box that played whilst little ladies drank tea in an arbour twined with roses; a tiny pair of infant's shoes worn 70 years ago; a huge seaman's knife; a feeding bottle 80 years old; and a box made from a piece of the first mulberry tree planted in the Clare district, were all objects of interest, as was also a beaded bell rope brought from Germany in the early days of South Australia. There were exquisite examples of handwork in crocket tapestry, embroidery, and bead work, all of which were worked many years ago; whilst a handsome hooked rug and doorslips and knitted garments were examples of modern handicraft. The number of entries in the knitted jumper competition and quality of work made it difficult for the judges (Mesdames Story and Goudie, of Peterborough) to select the winners. The first prize was awarded to Mrs. K. Symonds and Mrs. A. Davies secured second honours. The prizes for best collection of jams were won by Mrs. F. Cummings first and Mrs. A. J. Symonds second (prizes donated by Branch). During the afternoon Mrs. W. Sandow, of Peterborough, gave an interesting talk on her recent trip to Fiji, and showed various native-made articles, beautiful pieces of coloured coral. and photographs and postcards. Musical items were rendered by Mrs. Hawke, Misses H. White, and A. Cummings and G. Napper. (Secretary, Mrs. E. L. Orchard.)

CLARE (Average annual rainfall, 24.56in.).

June 2nd.—Attendance, 25.

DRESSMAKING.—The subject for the afternoon was entrusted to Mrs. A. H. Rogers, who read a paper on "Dressmaking." She also had patterns, and with the aid of one of the young members, was able to show the correct way of fitting a figure. Questions on buttonholes on thick materials. reveres, fitting of sleeves, and gored skirts were some that were answered. *Making Clothes.*—Clothes are for covering, adornment, and to fulfill the demands of law. Warmth and comfort in the cold weather seem to be the greatest need, but in summer time it is even a harder matter to provide cool and suitable clothing. Appearance plays a great part in dress—all races of the world adorn themselves. Since the wearing of clothes is a necessity, so also is the making of them either by ourselves or others who have acquired the skill. There is an art in the making of clothes that fit well and are suitable to one's needs and individual style. Something can be made that is just a garment, but with care and accurate measurement the simpler articles of dress can be made quite nicely by the merest novice. Children's frocks now are almost the exact replica of their elders; they have their coats to match their frocks, and even bags of the same colour. This is a part of dressmaking that is interesting and economical, for often a piece of material that is too small for a bigger dress can be used for a child if the colour and pattern are suitable. More time and thought might be put into sewing, for there is a growing tendency to put it in the background. Some say that the factory garments are all right and cheap enough; others have let knitting obsess them—good in its place, but not instead of trying to do sewing. Beside the joy of creating, the frock is the soothing influence of the sewing and the satisfaction of saving the cost of the work. If unable to cut without a pattern, secure a simple one, see if it corresponds to the measurement required, and if not quite certain, cut another from it in newspaper, allowing the difference needed for the size. Time spent at this stage of the work is well repaid. Place the pattern on the material very

carefully and cut with turnings, allowing a good margin at the neck and armholes. If the material is at all loose, run a tacking thread round the armholes and collar line and anywhere else that is likely to pull out of shape.'' (Secretary, Mrs. McKendrick.)

HOPE FOREST AND DINGABLEDINGA.

June 7th.—Attendance, 18.

The Grape and its Uses.—Paper by Mrs. R. Wade:—''Many people do not know the food value of the grape. It is not only useful as a dessert food in its ordinary ripe stage, but can be used in many other ways. First, to obtain the dried fruit, select sound, ripe fruit, and have a dip prepared of boiling water, with addition of caustic soda, ¼lb. soda to 10 gallons of water. Immerse fruit in a wire basket for about 10 seconds, then spread on trays in the sun to dry. There are a number of other ways of using the Muscatel besides those generally used, such as making them into sauce, pickles, chutney, as well as preserving for dessert use. They can be made into vinegar, as well as grape juice—a very nice summer drink. This juice is also used to flavour invalid foods. Jam made from Muscatels and apples is very nice; the acid in the apple tones down the sweetness of the grape.

Grape Recipes.—*Grape Juice.*—Choose only sound grapes. Pick grapes from stems, and to every 15lbs. of stemmed grapes add 1 quart of water; sprinkle ¼ cup sugar (granulated sugar is best); heat slowly to boiling, boil 10 minutes to extract flavour from skins and seeds, also to sterilize the fruit. The small amount of sugar used helps to bring out the flavour while not adding material to sweeten the juice. As soon as the juice boils dip out and strain into sterilized warm bottles, filling one at a time, and cork tightly, then dip in melted wax to thoroughly seal. Can be made with any grapes except sweetwaters. *Grape Vinegar.*—To every 3lbs. of grapes picked from the bunch add 2galls. of water (previously boiled and allowed to get cool). Place in an earthenware jar in a cool place for five days, stirring morning and night, then strain through muslin. Add 1lb. sugar to 1gall. of juice. Allow to stand in earthenware jar with light cover over to keep out dust, for about six months, then strain again and bottle. Ready for use straight away. *Grape Chutney.*—1lb. grapes, ¾lb. each apples and sugar, ¼lb. sultanas, ½oz. garlic, ½ teaspoon salt, ¼ teaspoon ginger and cayenne pepper; cover with vinegar, stand over night, boil 2 hours. *Pickled Grapes.*—Boil 1 quart vinegar with 1lb. sugar, ½ teaspoon salt, 1 teaspoon cinnamon, cloves, allspice, pepper, and a little whole bruised ginger. When cool pour over grapes which have been cut off the bunch, leaving a small piece of stem on each. About 6lbs. grapes for above amount of vinegar; ready for use in about 1 month. (Secretary, Mrs. L. Fincher.)

WARRAMBOO.

June 8th.—Attendance, 12.

Ornamental Trees and Shrubs.—Paper contributed by Mrs. D. Chilman:—''Of all the various forms of gardening activities, the growing of ornamental trees and shrubs gives the most lasting pleasure and benefit, and in the long run gives the best return for the amount of labour and expense involved. In a district such as ours there are not many native trees of any beauty, and very few homes can be built among beautiful natural trees, so it becomes necessary to grow our own for shade and shelter, as well as to beautify our holdings. The various kinds of gums are the most satisfactory trees to plant in this locality, particularly the Tooart and sugar gum, being very hardy and quickly grown. These are quite easily raised from seed without any expense other than the purchase of a 6d. packet of seeds, which will give a supply of young trees for a number of years. Pepper trees, too, are a good stand-by, requiring plenty of room and protection from stock. These, too, are easily raised from seed, and do particularly well in sandy soil. The tagasaste, or tree lucerne, is a nice flowering tree, growing quickly, with graceful foliage. The various pines (such as *Insignis*, or Remarkable pine, the Aleppo, and various others), make very nice trees eventually where they survive, but are so slow growing one gets disheartened with waiting for them to show up. Sometimes the native pines can be dug up in the scrub and transplanted near the homestead at an early age, and will in time grow into very handsome trees. When planting any of the large-growing shade trees remember they are all great robbers, and to make sure they are not planted near where fruit trees, vegetables, or flowers are expected to grow. When we come to the question of shrubs, we have a very wide range from which to choose, but to keep to the more hardy varieties suitable for a dry district such as ours, the old-fashioned Oleander takes a lot of beating, doing well in almost any situation. Some of the varieties give a really wonderful show of blossoms in beautiful colourings. The Tacoma family furnishes a wide range of very ornamental shrubs, both as regards blossoms and foliage, the best known being the Scarlet-flowering *Tac. capensis.* The various species of Hybiscus, too, should do well in this climate and soil. The Pussy Willow is a shrub which has become very fashionable in recent years, and is too well known to need any comment.'' (Secretary, Mrs. M. Steer.)

MANGALO (Average annual rainfall, 14in. to 15in.).

June 13th.—Attendance, 10.

GIRLS' HOBBIES AND RECREATION.—Paper contributed by Miss H. Hannemann:—"Most girls have some special hobby or recreation which changes with the seasons of the year. There are several which one may indulge in during winter, but they are hardly suitable for summer, and *vice versa*. Knitting is fascinating for winter, and is most appropriate, for during cold weather the hands do not perspire in the handling of wools, thus spoiling the work. Usually whatever is being made is unwashable or would be considerably spoiled in washing. Many girls knit their own pullovers or cardigans of wool for winter wear, and dainty jumpers of wool and silk, or silk, in an open stitch are nice for sports wear. For ordinary knitting a good light is not so necessary as for needlework, and often it is more convenient to take it up in any spare moment. Quite a number of girls, when going to a concert, take their unfinished pullover, beret, or scarf and get quite a lot done while awaiting the commencement of the show or during the interval. There are hundreds of books of instructions on sale for knitters that may be purchased for a shilling or less. Cards with instructions for one garment only are obtainable also for a few pence. Other books describe various stitches. Being able to knit one's own jumpers makes them much cheaper, so that one can have a change more often. This season girls have been crotcheting berets and toques to match each jumper. This is very interesting. Crochet work is also done in cotton, and some very dainty d'oyleys are made. A few years ago lace edgings were very popular, but just at present there are not so many made. Tatting is more complicated. There are different designs and they make neat edges for ladies' handkerchiefs and d'oyleys. As a rule more art needlework is done during summer. A better light, good eyesight, and a steady hand and often plenty of patience are needed for this work. House linen, children's clothes, lingerie, &c., are often finished and made to look quite different with the addition of a small spray or design in the same or contrasting shade of thread. There are countless numbers of fashion journals on sale, most of which contain several free patterns, and explicit directions for cutting out, so that many girls are able to make their own frocks. This is also a saving, for often with the money which would be paid to a dressmaker for making a frock another dress length of washing or inexpensive material can be purchased. Reading is many girls' main indoor pastime. It is most educational if the right books are read, and increases a person's knowledge, especially English. Fewer girls do painting and photography where lessons can be taken. Gardening is very interesting and a healthy outdoor hobby where conditions are suitable and water plentiful. Every girl is fond of flowers and they brighten the inside as well as the outside of a home. For outdoor sports in summer tennis is undoubtedly the most healthy and popular game. Golf is a winter sport, and involves a good deal of walking. Basketball is very exciting, but a bigger number is needed to form a team. For girls, running is not such a popular sport as others, but for those who do it it keeps them fit as do all outdoor sports. Then sometimes of an evening when one is not really tired, but feeling a bit "blue," a dance is a very good remedy. A little bright music and meeting a few friends will brighten dull spirits." (Secretary, Mrs. B. Coles.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Gladstone	19/6/34	25	Annual Meeting	Mrs. L. Sargent
Wasleys	14/6/34	30	Address—Mrs. K. Hall	Miss J. Brown
Pinnaroo	1/6/34	20	Homestead Meeting	Mrs. F. Atze
Kalangadoo	9/6/34	7	Annual Meeting	Mrs. H. Brooks
Saddleworth	3/7/34	14	Handicraft Exhibition	Miss G. Frost
McLaren Flat	5/7/34	23	Question Box	Miss I. Nicolle
Tantanoola	4/7/34	—	"Pruning," A. L. Warren	Mrs. E. Telfer
Balumbah	4/7/34	7	Annual Meeting	Miss H. Jericho
Clare	7/7/34	36	Annual Meeting	Mrs [illegible]. Pollock
Snowtown	5/7/34	61	Address—Dr. Hillier	Mr [illegible]. Hocking
Taplan	11/7/34	19	Question Box	Mr. [illegible]. Flynn
Gladstone	17/7/34	39	Address—Mrs. Mughall	Mrs. L. Sargent
Wilmington	12/7/34	34	Papers from *Journal*	Mrs. P. Cole

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. SEPTEMBER, 1934. No. 2.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Fruit (Non-irrigated Districts), at Balhannah, Tuesday, November 6th, C. G. Grasby (Secretary).

The Conference will commence at 10.30. Members of Branches are invited to submit papers and questions for the agenda.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held as follows:—

Karoonda, Wednesday, October 3rd.
Jamestown, Wednesday, October 10th.
Loxton, Wednesday, October 10th.
Clare, Saturday, October 20th.
Burra, Wednesday, October 24th.
Minlaton, Wednesday, October 24th.
Mount Gambier, Wednesday and Thursday, October 24th and 25th.
Murray Bridge, Thursday, October 25th.
Woodside, Saturday, November 3rd.

Feeding Value of Soya Beans, Blue Lupins, and Panicum.

The Deputy Director of Agriculture (Mr. W. J. Spafford) in a reply to a correspondent says the seeds of the Soya bean have high feeding value from both the fattening point of view and the production of milk, the starch equivalent, when containing 10 per cent. of moisture, being 83.9, whilst that of peas with the same moisture content is 71.8, and the nutrient ratio of Soya beans is 1 to 1.94, against 1 to 2.81 of the peas. The growth of Soya beans can be used as green forage, stored as silage, or made into rather coarse hay, but where this plant grows strongly it is usual to use cow peas for these purposes, instead of Soya beans. They do not do well in cool, temperate climates.

Blue Lupins.—The Blue Lupin is only of value for livestock because the animals eat the seeds, but the growth is rarely touched by them. The starch equivalent of Lupin seeds, when containing 10 per cent. of moisture, is 74.3, and the nutrient ratio 1 to 2.0. The Blue Lupin has practically no value as a fodder crop. Where grown for livestock it is allowed to ripen its seeds, and when these have dropped to the ground sheep are turned on to the crop and fatten on the seed. It does not mature big crops of seed in South Australia, and so is only useful in this State as a sand-binder.

Panicum.—The seeds of Panicum are used as bird seed, but the crop is usually grown for green forage or to be converted to silage. The green forage has about the same feeding value as maize for large stock, and a slightly higher value because of finer texture for small stock and poultry.

Non-Setting of Black Prince Grapes.

Mr. G. Quinn (Chief Horticultural Instructor) advises the Secretary of the Marama Branch of the Agricultural Bureau, who reported that a 10-year-old Black Prince vine in his garden each year did not "set" its fruit, that this variety is a notoriously bad setter in the coastal vineyard areas of this State, but usually in the hotter inland districts, such as the Murray Valley and Upper North, it sets well when grown amongst other sorts. The exact cause has not been worked out, but it is evidently bound up in the matter of pollination.

It is suggested, if the owner of these Black Prince vines has another sort or sorts which bloom simultaneously with that variety, it would be worth while collecting pollen from the bunches of flowers of the other sorts—say into a glass dish and with a camel-hair brush, or a rabbit's tail—transfer it on to the flowers of the Black Prince bunches by rubbing the brush carrying the pollen up and down the bunches or inflorescences, when most of the caps have fallen from the flowers.

Potato Scab.

A subscriber to the *Journal of Agriculture* seeking information as to the best treatment for seed potatoes affected with scab, has been informed by Mr. George Quinn that two chemical treatments have been used against this disease, viz., solutions of formalin and mercuric chloride. They are applied to the seed tubers as follows:—

Formalin.—Commercial formalin (40 per cent. strength) has been used at the rate of 1lb. in 30galls of water. The tubers are placed in a loose, open-woven bag or hessian and steeped in the solution for two hours, then taken out and dried for a short time before being cut, if necessary, into sets for planting, which should be carried out without undue delay.

Mercuric Chloride (Corrosive sublimate).—This is used at the rate of 1oz. in 6galls. of water. The mercuric chloride is first dissolved in several quarts of hot water, and then made up to the above strength with cold water. A wooden vessel is desirable, as the chemical corrodes metal. The seed tubers are steeped and treated similarly to those where formalin is used.

More recent investigators prefer the mercuric chloride as a preventive of this scab, and claim greater efficiency for its use. It is a deadly poison if swallowed by animals and human beings, so that great care is essential in handling and storing it where no children or careless persons can have access to it.

Soils which are alkaline should be avoided in potato growing, as this disease is more frequently noticeable wherever fresh ashes or limestone marl has been freely mixed with the surface soil. The prevention of the attack of the disease makes for an increased yield of marketable tubers.

Sheep Blowfly.

Mr. C. T. McKenna, B.V.Sc., of the Stock and Brands Department, has supplied the following reply to a question, "What is the best method to prevent blowflies from striking sheep?" submitted at the Yeelanna Conference:—

Science Bulletin No. 40 of the New South Wales Department of Agriculture of 1933 gives the following information:—

The blowfly pest cannot be combated by any one method alone. The following methods are recommended:—

1. Crutching properly done is of proved value.
2. *Breeding.*—As the predisposition to strike in the crutch region is inherited and can be recognised (badly wrinkled about the breech), the general susceptibility of the flock may be reduced by selective breeding. It is considered that satisfactory wool quality can be retained by judicious selection.
3. *Jetting.*—This is of distinct value when undertaken immediately prior to or during a strike wave. (It is not practicable in small flocks owing to the cost of the plant).
4. *Fold Removal Operation.*—By the surgical removal of the side folds the breech is opened up, urine soiling reduced, and susceptibility to strike decreased.
5. *Dressings.*—Many dressings for treatment of struck sheep have been tried. Not one is wholly satisfactory, but the following have been found useful for routine dressing:—(*a*) 5 per cent. solution of zinc sulphate in water (approximately 1oz. of zinc sulphate to the pint of water). (*b*) 5 per cent. water solution of "Monsol." (*c*) 4 per cent. carbolic crystals in whale oil. Note.—5 per cent. water solution of copper sulphate is satisfactory except for the staining and harshness imparted to the wool.

6. *Trapping.*—The available evidence does not yet permit of a definite opinion being expressed as to the value of trapping. When trapping is practised, attention should be paid to the following:—(*a*) The trapping should be systematic, particularly prior to and during periods of strike. (*b*) Traps should be placed where sheep congregate. In hot weather they should be placed in shady situations. (*c*) If a meat bait is used, rebaiting must be frequent. (*d*) The trap should not allow the escape of any flies.

7. *Carcass Destruction.*—This is a sound sanitary procedure in the agricultural areas; carcasses should be carefully burned or buried deeply.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—

"Year Book of Agriculture, 1934," U.S.A.

Annual Report, 1932, Department of Agriculture, Ontario.

Bulletins issued by Ministry of Agriculture, England:—No. 1, "Some Diseases of Farm Animals," price 2s.; No. 60, "Asparagus," price 1s.; No. 70, "Ducks and Geese," price 1s; No. 73, "Red-furred Rabbits," price 1s.; No. 75, "Poisonous Plants of the Farm," price 2s.; No. 77, "Tomatoes: Cultivation, Pests, and Diseases," price 1s. 6d.; No. 79, "Fungus and Other Diseases of Crops, 1928-1932," price 2s.

"Bulk Handling of Wheat," L. B. Mercer, M.C.E., price 1s. 6d.

"Scientific Principles of Poultry Feeding," Bulletin No. 7, price 9d. net, Ministry of Agriculture, England.

"Annual Report of the East Malling Horticultural Research Station, 1933," price 4s. net.

"Cattle and Beef Survey of the World." Report I.E.C./S.1. Imperial Economic Committee, England; price 5s. net.

"Methods of Analysis for Insecticides and Fungicides," Bulletin 82; price 3d.

"Pigkeeping," Bulletin No. 32; price 1s. 6d. (Published by Ministry of Agriculture, England.)

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. Spafford, Deputy Director of Agriculture.]

Magnesia Patches.

Yeelanna Conference: What is the best method to control magnesia patches in the soil, and what treatment is required to stimulate the growth of grass and cereals?

Reply—There are no such occurrences as magnesia patches in South Australia, but the question obviously refers to sterile patches of soil caused by an excess of common salt. The sterility of these patches is due to the concentration of soluble salts (very largely common salt) at the immediate surface of the land being so great that seeds cannot germinate, or if they do the seedlings are unable to survive for any length of time.

In the wheat-growing districts of the State it is extremely difficult to control these salt patches, because in most places it is seldom that sufficient rain falls to wash the excess of salt deep enough into the soil to permit of a good germination of seed, and unless the surface of the soil is protected from heavy evaporation by plants or some other covering the trouble will never be overcome.

Where the patches are relatively small and where plenty of farmyard manure is available, pastures can be established by ploughing the land deeply in the early winter, say 6in. to 8in. in depth, immediately covering the surface with a good layer of farmyard manure, and sowing a mixture of 6lb. of each of King Island Melilot and Wimmera Rye Grass to the acre in the manure. The resulting pasture must never be over-stocked during the first few years after establishment and stock should be removed long before the land has been bared.

It is a much more difficult problem, however, to be able to correct the trouble of excessive salt to the extent of again growing good cereal crops on the land. The concentration of salt at the surface is greatest in the autumn, and so it is unreasonable to expect wheat and oats to germinate well if sown in early winter. The salt must be lowered from the surface by ploughing the land to a depth of 6in. to 8in., being careful to turn the soil right over, covering the surface with well-rotted farmyard manure, leaving it exposed to the winter rains, and seeding with barley in early spring. If the barley fails an attempt should be made to establish Sudan Grass later on in spring. Given a wet winter, success should be attained in securing a cover for the land, but care must be exercised in not feeding the crop too severely nor in cutting it too closely, and the land should be cropped three or four years in succession to render it fit for cropping with cereals in the ordinary way.

In extreme cases of excess of salt it may be necessary to scrape from 1in. to 2in. of the surface off the affected areas at the end of March or early in April and cart it right away from the patch, before proceeding with the method of correction already described.

Drake.

Yeelanna Conference: The weed "Drake" grows abundantly around crabholes filled with water, on water-logged soil, and on new land. How does it originate?

Reply—Drake, or darnel, is one of the most persistent of the weeds which accompany the cereals, and is particularly bad in new districts, and more so where the rainfall is heavy and the soils raw than where sweet soil conditions obtain and where the rainfall is lighter. In the earlier days of wheat-growing in South Australia this weed was so bad in wheat crops that a special machine was on the market, known as a "drake screen," to remove drake seeds from the wheat before offering the grain for sale. Because of the mellowing of the soils by cultivation for crop growing, drake has been kept under in most of the older wheat-growing portions of the State, yet even in those districts it has by no means been wholly eliminated. In clayey soils or where a clay subsoil is near the surface, drake persists as a weed for a very long time because these soils take so long to become mellow, and as the weed is a water-lover it grows strongly in wet years in those locations where the cereal crops suffer because of the excessive wetness.

Drake can only develop from a seed matured by a drake plant, and although the weed is not much in evidence in the drier seasons, it is a most persistent weed and there are usually enough plants present to produce sufficient seed to foul crops in wet years. Besides this power of developing seeds on the smallest of plants, drake, like most other persistent weeds, also produces some weeds which do not germinate readily in the season they are matured, and this carry-over is generally sufficient to help account for the presence of plenty of plants in seasons favourable to their growth. When careful bare-fallowing is practised and seed wheat is properly graded, it is not usual to find many drake plants in crops, and those that are present originate from the seeds left in the ground from a previous year.

Ensilage.

Yeelanna Conference: How can stock be encouraged to eat ensilage?

Reply—There are so many cases of cattle and sheep, including some reared on stations, which have never seen silage before taking to it readily, and I have seen so few animals refuse silage of good quality, that one cannot help thinking that there is something wrong with the article being persistently refused.

If the silage is charred through being made from over-mature, rather dry forage, insufficiently weighted in stack or silo, the chances are that stock will take it fairly readily if it is sprinkled with crushed grain or bran, but if the silage is the sloppy, yellowish mass with highly objectionable odour resulting from throwing sappy growth together too quickly, it will only be taken by farm livestock in times of drought when foodstuffs are short.

Good silage should have a sweetly, nutty aroma and a pleasant slightly-acid flavour, and when of this quality most livestock eat it greedily.

Takeall Control.

Yeelanna Conference: What are the best means of controlling "takeall" so prevalent in the second and third crops of wheat grown in the Yeelanna district?

It is an incorrect agricultural practice to crop land with wheat two seasons running, and still worse to grow three wheat crops in succession, anywhere in South Australia, let alone in a district like Yeelanna, where all wheat crops are liable to attacks of "takeall" unless the greatest of care is shown. Yeelanna is a really good wheat-growing district, and good crops can be grown by all who understand the conditions and prepare against "takeall," but where this disease is so liable to occur, and can do so much damage, wheat should never follow wheat. If there is any desire to grow wheat on land not in bare fallow, it should be on grass land, and then with special soil preparation, but it would be much better for most farmers only to grow wheat on bare fallow. The principal argument used in favour of continuously cropping land with wheat, that it hastens the clearing of scrub, does not hold good in any mallee district in the State, for without exception the farmers who have farmed small areas properly without continuous cropping have cleared up their land, subdivided their holdings, and carried full flocks of sheep long before the big-area rough farmers who crop land year after year with wheat.

The only chance of growing wheat crops free from "takeall" with any degree of certainty, on land not fallowed, is to secure a good burn before preparing the land, then while the soil is still hot from the fire it should be harrowed or lightly stirred in some way. As soon after as possible it should be cultivated and then sub-packed. As the seeding of such land should be delayed as long as possible and an early variety used, a further shallow cultivation will be necessary, and the packer should again be

used, either before the drill or soon after, depending upon circumstances. A liberal application of superphosphate should be given.

Although it is possible to get good crops from wheat crops grown on land that carried wheat the previous year in a district like Yeelanna, where the climatic conditions are favorable for wheat-growing, it would be much better for all wheat-growers, and certainly of great advantage to the State, if the practice was never followed, and with very few exceptions it would be better for all concerned if wheat was only grown on land prepared as bare fallow.

Wild Oats.

Yeelanna Conference: Why is it that wild oats seed will not germinate for several seasons in some instances?

Reply—The delayed germination of some of the seeds of most of the troublesome weeds is a provision of Nature, enabling such plants to persist, and it is certainly this power which leads to the difficulty of eradicating such a weed as the wild oats, for if all seeds germinated the season following their development, such a good fodder plant would be eaten out in one year. It appears that some of the seeds of wild oats are so closely enveloped in their outer skins that sufficient moisture cannot penetrate to the kernels to lead to their germination, until the outer skins partly decay, and depending upon the conditions where the seeds lodge so the time taken to reach this stage varies and may even extend to several years.

Rust in Wheat.

Yeelanna Conference: Has any further progress been made concerning the origin of rust in crops, and what discoveries have been made to control rust?

Reply—The life history of "rust" disease of crops which does most damage in the world—the Stem Rust of Wheat—has been thoroughly understood for generations in most wheat-growing countries, but there is a hiatus yet to be definitely filled in the life-history of the Australian form. The stage between the wintering spores and the uredospores which are first developed in the spring is yet to be discovered, but once uredospores are produced it appears that wind blows them about to be a source of infection wherever they may lodge.

The world over, pathologists and plant breeders are working towards the control of Stem Rust of Wheat, and the bulk of their activities are in the direction of the production of heavy-yielding varieties resistant to the disease. No great trouble has been experienced in obtaining disease-resistant crossbreds between the bread wheats and durum wheats, and between bread wheats and emmers, but securing this resistance combined with the power of producing heavy grain yields is very difficult. In the United States of America some rust-resistant crossbreds between Marquis and emmer now being distributed with confidence that they will yield well, but these particular kinds are not at all promising in Australia as field crops. One of these American crossbred wheats, "Hope" by name, is giving very encouraging results as a parent of rust-resistant wheats in New South Wales, and at present it appears that some of the apparently heavy-yielding crossbreds have high rust-resistance and more should be heard of them in the near future.

Cropping Sandhills.

Kyancutta Conference: Are the sandhills of the Warramboo district worth cultivating and sowing for wheat?

Reply—In very few mallee districts of South Australia are the sandhills capable of frequently producing payable crops of wheat, and with the average annual rainfall as low as that of the Warramboo district, good results can hardly be expected from wheat crops unless the land is rested from cropping and left to produce pasture for relatively long periods between crops. Where the sandhills do not form an excessively high

proportion of the holding, the scrub should not be removed from the ridges and although the protection of the scrub leads to some inconvenience in the early days of settlement, the final result makes it worth while. After the scrub has been cleared from the sandy portions of holdings, the aim should be to crop seldom and carry as many head of stock as possible. This can only be done by growing some fodder crops for a few years in succession and then producing a crop of wheat. Lucerne will do fairly well on such sandy land, and if the pasture is maintained for about four years a good crop of wheat could be grown before again seeding down to lucerne. Failing lucerne, cereals such as oats, rye, or barley, or mixtures of any or all of them, could be sown in the autumn of each of three or four years in succession, to be grazed down by livestock and then the land could be cropped with wheat.

If lucerne is adopted as the grazing crop, 4lb. or 5lb. of seed mixed with 1cwt. of superphosphate should be drilled in to the acre in the autumn or winter with a disc drill in the stubble of the wheat crop without previous cultivation. Whole fields should be sown to lucerne, or the portions of fields seeded to the crop should be fenced off, as it is impossible to properly establish lucerne on part of a field unless the remainder of the field is seeded to a grazing crop which grows at the same time as the lucerne, and at present such a crop is not known for the Warramboo district.

Other than lucerne the only pasture plant which can be grown with any degree of certainty is Wimmera Rye Grass, and it can be established by seeding 2lb. of seed per acre in a cereal crop that is to be harvested for grain. The seed would be mixed with the superphosphate in the manure-box of the seed drill. After three or four years of Wimmera Rye Grass the land can again be cropped for one season, and then rested under pasture for a few more years before being put under wheat again.

HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. G. Quinn, Chief Horticultural Instructor.]

Fruit Trees for Central Eyre's Peninsula.

Kyancutta Conference: The best variety of fruit trees for Central Eyre's Peninsula?

Reply—From experience gained in the orchard at Minnipa Experiment Farm, the following kinds of fruits appear best suited:—Apricots—Newcastle Early, Oullin's Early, and Moorpark; almonds—Preferably hardshells on account of parrot pest; figs—Early ripening sorts, such as White Genoa and Black Ischia; peaches—Suggest early midseason sorts, such as Wright's Early, Elberta, Louis Grognet; pears—Clapp's Favourite, Packham's Triumph; grape vines—Green's Early, Golden Chasselas, Sweetwater, Red Malaga, Red Frontignac, Black Muscat Hamburg, Black Prince; orange—Washington Navel, Siletta; mandarin—Dancy's Tangierine; lemons—Lisbon Improved. Whilst all trees would benefit from irrigation, it is quite essential for the oranges and lemons.

A member of the Kyancutta Branch stated that he had grown Mountain Rose peach, Muscatel, and Red Malaga vines with success. He said that early varieties of fruit trees appeared to grow better than later varieties.

White Ants Attacking Fruit Trees.

Kyancutta Conference: What is the best plan to prevent white ants from attacking fruit trees?

The following reply is taken from page 156 of the September, 1931, issue of the *Journal*:—Termites usually find an entry *via* a dead area, such as is left where roots have been broken or cut away when planting, or where the spade, hoe, or fork has damaged and exposed the wood near the soil line when digging or working around the trees after they are planted.

Undoubtedly, the best method of circumventing these pests would be found in sowing the stones of almond, peach, or apricot on the spot where the trees are to be grown, and budding them on the spot well up the stem away from the ground. This avoids the broken root danger.

Mr. Quinn planned this type of propagation in the orchard at the Minnipa Experiment Farm, but the absence of a skilled orchardist in the first years spoilt the experiment, as the efforts at budding were not made at the right stage of growth of the seedlings, and the wounds ultimately made on the rootlings when beheaded were too large, and not sufficiently protected to secure a rapid healing over of the injured tissue.

As a good percentage of seedling peach, apricot, and almond trees produce quite good fruit—though not necesarily resembling the fruits of the parent tree—it might be worth while, under the circumstances, growing some seedlings, even if they are never budded or grafted to known kinds. If this is tried, make holes as if to plant a tree, and after filling them up, place a stake in the middle of each and plant three fruit stones around each stake. If they all grow and become established, the surplus can be pulled out a year later.

In preparing holes for fruit trees with animal manures as a fertiliser, do not use much manure in each hole, and what is used should be thoroughly mixed throughout the lower or subsoil. For instance, open a hole 3ft. square, taking off the first spade depth. Then break the subsoil for about a foot deep with a pick or crowbar and do not remove this soil, but mix about half a small barrowful of the manure very thoroughly with it, and then fill in some of the top soil before planting the tree on a central mound. Do not place the roots in direct contact with this added manure, but place it where the new roots must search for it.

There is nothing known to Mr. Quinn that can be painted on to the bark or stems or roots which will prevent or kill termites without also injuring or killing the trees, but dead scars may be coated with tar or even arsenic solution. If, when planting, any roots are found to be broken or in need of reduction, a dab of tar could be placed over the cut end.

An idea worth trying would be to take some stakes—soft wood of something favoured by termites—and soak them in a solution of arsenic before burying or driving them into the ground around the tree. These would act as permanent poison baits for the termites.

Arsenic solution could be made by boiling about 4oz. of white arsenic and 8ozs. of washing soda in a couple of gallons of water in a petrol tin until all is dissolved—about 20 minutes. Then fill the tin up for steeping the stakes. Care must be taken in handling and boiling arsenic—do it outdoors if possible—and the tin must not be afterwards used for any other purpose or the solution left where children or animals may reach it.

A mulch of stable manure spread on the surface above the root spread about October would prove valuable in keeping the soil cooler and moister during the summer months.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"Hamilton" reports pig sties infested with fleas.

Reply—It is very difficult—often by any special treatment—to eradicate fleas from any premises which they infest, and if left to themselves they will often ultimately disappear just as suddenly as they came. It would be advisable to leave the sties empty of stock for a time and house the pigs away in fresh temporary premises. All litter, &c., should be removed and burnt and the sties thoroughly cleaned out and disinfected. Subsequently occasional lime-washing with a pint of kerosene added to each gallon of wash will prove helpful.

"Tintinara" asks for (1) *Strength and dose of bluestone drench for sheep, and* (2) *Suitable lick for sheep and cattle.*

Reply—The following are the particulars:—Copper sulphate (bluestone), 1lb.; water, 6galls. Use only fresh crystals of bluestone and use glass or earthenware containers. Dissolve the bluestone in ½gall. to 1gall. of boiling water and then add cold water to make total quantity up to 6galls. If desired, 13½ fluid ozs. of nicotine sulphate (Black Leaf 40) may be added to the above amount of bluestone solution. This increases the efficacy of the dronch, particularly against tapeworms. Doses to be given:—Adult sheep, 2 fluid ozs.; two-tooths, 1½ fluid ozs.; lambs (6 to 12 months), 1 fluid oz.; lambs (2 to 6 months), ½ fluid oz. (1 tablespoonful equals ½ fluid oz.).

(2) Suitable licks are either of the following:—1. Dicalcic phosphate, 50 parts; coarse salt, 50 parts; molasses added up to 10 per cent. 2. Sterilized sweet ground bonemeal, 60 parts; coarse salt, 40 parts.

"Truro" reports (1) *Death of four cows; loss of milk, stiff in front legs, tongue swollen with slobbering, off feed.* (2) *Horses continually stamping feet, which are very scaly.*

Replies—(1) The cattle died from botulism (dry bible). The toxin (poison) which causes this disease is usually obtained from contaminated bones or carcasses of dead animals (including rabbits), which cattle frequently chew during the dry period of the year in their search for mineral matter. The bones or carcasses become contaminated by germs invading them and manufacturing the poison or toxin in surroundings which the germ likes. The disease is usually fatal. The only treatment which could be tried is to give a teaspoonful of powdered nux vomica three times daily for five days. (Mix the powder with treacle and smear well back on the tongue.) Drenching is not advised, as frequently the animal cannot swallow. Occasionally cows can contract the

disease by taking the toxin in the feed. In this case the feed (chaff) has been contaminated by mice which serve as the animal matter (in place of bones or carcasses) in which the germs can manufacture the poison. Again, dam water may contain the toxin by coming in contact with affected carcasses.

(2) It is suggested that the legs be washed with warm lysol solution (1½ teaspoonfuls to the pint) once daily for three to four days. An old scrubbing brush is useful. Subsequently apply the following lotion daily:—Creosote, 1 part; turpentine, 6 parts; raw linseed oil, 20 parts.

"Clarendon" has a foal with a navel rupture.

Reply—The presence of a hernia (rupture) is dangerous in proportion to its size. A small one may not interfere with the health of the animal and may disappear before the animal is twelve months old. If large, an operation is required owing to the danger of portion of the gut being caught in it and strangulated. If the swelling is only 2in. or 3in. in diameter, it is suggested that a blister, such as red iodide of mercury —strength 1 in 8 of lard—be applied once or twice with a ten-day interval in order to cause swelling of the skin, which will tend to push the contents of the sac into the belly.

"Milang" reports two ewes which have gone completely blind.

Reply—The conditions described point to the disease being due to a toxaemia (poisoning), which often occurs in pregnant ewes, especially those carrying twin lambs and within the last month of pregnancy. The treatment indicated is to administer twice a day for three or four days (by smearing on the tongue) 2 tablespoons of molasses. From a chemist procure the following powders:—Take fused calcium chloride, 1 dram; one powder—obtain eight. One powder to be dissolved in a half-cup of water and given as a drench twice a day. Affected sheep should be given plenty of exercise if in fat condition.

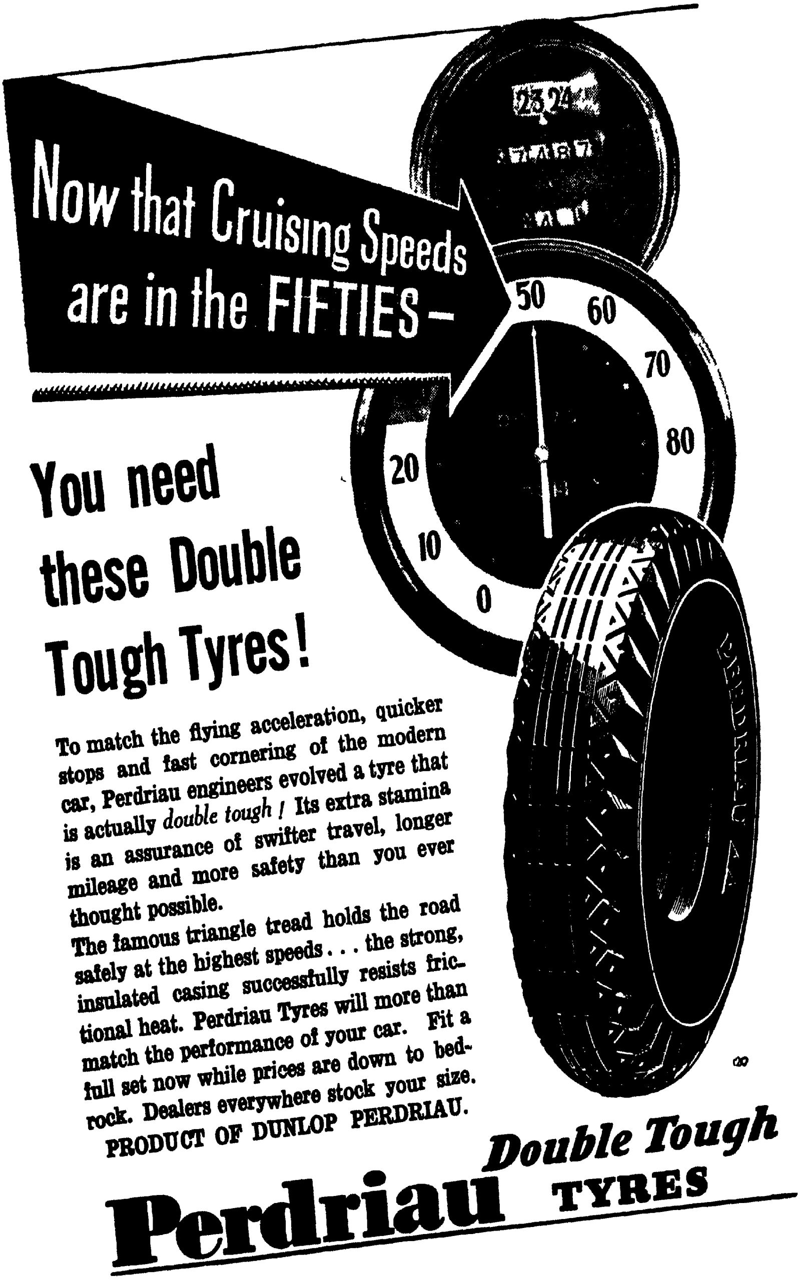
Blackheath Agricultural Bureau reports colt foal kicked on stifle joint 18 *months ago. A knocking noise can be heard when the horse trots.*

Reply—It is possible that the condition is a luxation (slipping out) of the patella (kneecap). As the condition is a chronic one, recovery is very doubtful. Try the effects of a blister (biniodide of mercury 1 in 8; you could get a small chip box full from nearest chemist). To use, clip hair from over kneecap. Wash thoroughly with warm water and soap to remove dirt and grease. Dry and rub in the blister over the area for 10 minutes at least. Subsequently tie up the foal short until next day so that it does not muzzle the part. Wash blister off next day and rub in olive oil. Repeat blistering if necessary in six weeks.

"Morchard" asks (1) *Cause of black spots on Merino lambs; and* (2) *Cause of "white eye" in cattle similar to pink eye in sheep.*

Replies—(1) The occurrence of the black spots or patches is an example of what is termed "reversion" or "throwing or breeding back," and they are merely due to the outcropping of a latent genetic or hereditary factor received from the ancestry of the animals. Such a latent factor as this may be transmitted through several generations before making its reappearance, and it does not necessarily imply that the animals are not "pure bred." It is a reminder that the remote ancestry of our present-day sheep had this fault and its now only occasional reappearance is due to attempts that have since been made by breeders to eliminate it.

(2) This is a contagious keratitis or inflammation of the cornea (interior surface of the eye). The condition at times occurs through unknown causes, but it may also originate from injury of some kind (such as scratches or pricks) to the cornea, or through an extension of an inflammation of the conjunctiva, or inner surface of the eyelids. The trouble very often clears up after a time without any treatment, and again, despite every treatment, it may become worse and worse and result in permanent loss of sight. A 1 per cent. solution of silver nitrate applied to the affected eyes three or four times daily is useful treatment; also a 2 to 3 per cent. ointment of yellow oxide of mercury, some of which should be placed on the inside of the eyelids twice daily.


Now that Cruising Speeds are in the FIFTIES –
You need these Double Tough Tyres!
To match the flying acceleration, quicker stops and fast cornering of the modern car, Perdriau engineers evolved a tyre that is actually *double tough!* Its extra stamina is an assurance of swifter travel, longer mileage and more safety than you ever thought possible.
The famous triangle tread holds the road safely at the highest speeds . . . the strong, insulated casing successfully resists frictional heat. Perdriau Tyres will more than match the performance of your car. Fit a full set now while prices are down to bedrock. Dealers everywhere stock your size.
PRODUCT OF DUNLOP PERDRIAU.
Perdriau
Double Tough
TYRES
50
60
70
80
20
10
0

POTATO EXPERIMENTS AT JERVOIS.

[By R. C. Scott, Supervisor of Experimental Work.]

Consequent upon the low prices which dairy produce has recently commanded in South Australia a number of settlers on the reclaimed swamp areas of the lower Murray have been testing different crops in the effort to discover something which will yield profitable returns and ease the position in which they are placed.

Included in such crops are potatoes, and in order to provide information relative to the possibility of their successful cultivation a series of experiments were commenced in 1932 on the property of Mr. J. W. E. Schultz, at Jervois. In this connection it was considered advisable to conduct investigations not only regarding the cultivation of the crop but also to test the keeping and cooking qualities of the tubers harvested. The latter experiments were included because it has been frequently stated that potatoes marketed from the swamp areas will neither keep well nor provide foodstuff of pleasant flavour or good mash when cooked. As far as the tests regarding cooking qualities are concerned the Domestic Arts section of the Education Department very kindly co-operated in the work, and this line of investigation was carried out by Miss Ellie Campbell, Inspector of Domestic Arts.

However, before proceeding to a discussion of the results obtained an examination of the statistics concerning potatoes in this State will be of interest.

In the following Table particulars concerning this crop for the ten-year period 1924-33 are set out:—

Potatoes in South Australia, Seasons 1924-33.

Year.	Area.	Total Yield.	Acre Yield.	Average Price. Mount Gambier.	Average Price. Other.	Imports. Bags.	Imports. Tons. (Approx.)	Total Requirements.
	Acres.	Tons.	Tons.	£ s. d.	£ s. d.			Tons.
1923-24 ..	5,239	21,327	4·07	6 10 0	7 10 0	184,447	11,528	32,855
1924-25 ..	3,292	12,226	3·71	9 0 0	10 0 0	211,136	13,196	25,422
1925-26 ..	2,895	10,764	3·72	10 0 0	11 0 0	220,105	13,757	24,521
1926-27 ..	3,549	15,375	4·33	7 12 0	10 10 0	149,286	9,330	24,705
1927-28 ..	4,309	17,749	4·12	6 5 0	7 12 0	134,664	8,417	26,166
1928-29 ..	4,518	13,859	3·07	7 15 0	10 5 0	159,556	9,972	23,831
1929-30 ..	4,536	14,990	3·30	7 10 0	9 0 0	164,393	10,275	25,265
1930-31 ..	4,998	18,991	3·80	3 16 9	5 0 0	119,232	7,452	26,443
1931-32 ..	5,996	24,062	4·01	4 3 6	5 6 6	59,355	3,710	24,772
1932-33 ..	6,454	24,814	3·84	4 15 0	5 13 0	31,529	1,971	26,785

The figures showing the quantities of potatoes imported into South Australia have been extracted from the records of the Plant and Fruit Inspection Officers. The returns supplied show potatoes in numbers of bags, and an allowance of 16 bags to the ton has been made in order to convert the figures to a tonnage basis.

Included in the imports are the weights of tubers imported from other States, chiefly Victoria, for use as seed and this quantity probably represents about 2,000 tons per annum. It will be noted that in the preceding table the average price is quoted under two sections, namely, that for Mount Gambier potatoes, which includes those harvested in the South-Eastern districts generally, and that for potatoes secured from other areas in the State.

Considerable variation occurs from year to year but the value is consistently in favour of crops produced in the latter areas. As far as can be ascertained this difference is not regularly associated with any variation in quality, although in the present season the Mount Gambier potatoes are slightly inferior to those from the Adelaide Hills, but appears to be associated with damage caused by transport and the ability of growers situated close to the market to take advantage of any fluctuation in price that may occur.

Over the ten-year period the mean total requirement for potatoes in South Australia has been 26,077 tons per annum. The average yield is 3.80 tons per acre and on this basis a normal crop from 6,862 acres would fully supply the local demand for potatoes. As the acreage planted has steadily increased from 2,895 acres in 1925-26 to 6,454 acres in 1932-33, with a possible further increase for 1933-34, figures for which are not yet available, it would appear that we are approaching the limit for area of crop planted.

Potato Experimental Plots at Jervois.

On the other hand, the season just passed has proved very unsuitable for the development of good potato crops and in consequence instead of the local market being flooded 6,102 tons of potatoes have had to be imported during the 12 months ending June 30th, 1934. Further, the mean acre yield of only 3.80 tons indicates that considerable areas of land now planted are not well suited to the production of potatoes. Consequently, whilst it is not desirable that any appreciable increase in total acreage should occur there is evidence that considerable areas now utilised for this crop could with advantage to all concerned be better employed in producing other agricultural produce leaving an opening for planting additional land in districts where large crops of improved quality tubers can be regularly harvested.

Therefore, if it can be demonstrated that high yields for quality potatoes can be obtained from the reclaimed swamp lands there is room for expansion in this direction, but as an average crop from approximately 7,000 acres will supply the requirements of the State and the area planted in 1933-34 approaches this figure, such expansion must result in the squeezing out of growers situated in districts of irregular climatic conditions or those on relatively unsuitable soils.

There is another point which must be strongly emphasised, namely, that if additional planting is attempted the quality of the potatoes marketed must be above the general average of those offered to-day. In the absence of any Government certification scheme the grower must be his own inspector and be prepared

to build up a reputation as a man who regularly submits a uniform and reliable grade of potatoes. In this way the confidence of buyers will be commanded with consequent benefit to the producer.

The number of grades into which the tubers should be separated would depend upon the requirements of the trade, but without fail, all damaged, diseased, or inferior potatoes should be consistently excluded.

The position therefore, appears to be that if only average yields can be anticipated and no improvement in quality attempted, planting has practically reached the limit in this State but at the same time profitable expansion can occur if the crop is seeded under the following conditions:—

1. A climate which is regularly favourable or when irrigation water is available.

2. The soil type and cultivation methods are such that given adequate soil moisture and freedom from disease, yields at least approaching double those shown as the average for the State can be expected.

3. The grower is prepared to grade his crop carefully and only market clean sound tubers.

Unless such requirements can be complied with growers should not aim at any increase in area but on the other hand should seriously consider a curtailment of their operations. Therefore, when examining the results from the Jervois experiments and considering the possibilities of potato growing in these areas the foregoing facts must be kept clearly in mind.

MANURIAL EXPERIMENTS.

The area included in the experiment totalled approximately 3 acres in 1932 and 4 acres in 1933. In the former year two varieties, namely, Carmen and Up-to-date were seeded whilst in the latter season Carmen only was planted and each manurial dressing replicated four times.

The land was broken up in July and after good preparatory tillage seeding took place in early December. A few days prior to planting the block was irrigated.

The plan of experiment and the results obtained are shown in the following table:—

Manure.	Yield per Acre. 1932.			1933.			Mean.			Gross Value.			Nett Value.		
	Tons	cwt.	lbs.	Tons	cwt.	lbs.	Tons	cwt.	lbs.	£	s.	d.	£	s.	d.
No manure	8	4	57	6	5	19	7	4	94	36	4	2	36	4	2
3cwts. Superphosphate	8	12	106	6	5	18	7	9	6	37	5	3	36	10	3
3cwts. Superphosphate, 1cwt. Sulphate of Ammonia	—			6	9	37	—			—			—		
3cwts. Superphosphate, 2cwts. Sulphate of Ammonia	8	12	8	6	9	38	7	10	79	37	12	9	35	11	9
3cwts. Superphosphate, 1cwt. Sulphate of Ammonia, 1cwt. Sulphate of Potash	9	9	101	6	12	93	8	1	42	40	6	11	37	17	11
6cwts. Superphosphate	9	5	21	6	12	72	7	13	103	38	9	7	36	19	7
6cwts. Superphosphate, 1cwt. Sulphate of Ammonia	8	15	92	6	16	0	7	15	102	38	19	7	36	16	7
6cwts. Superphosphate, 2cwts. Sulphate of Ammonia	9	13	2	6	15	93	8	4	48	41	2	2	38	6	2
6cwts. Superphosphate, 1cwt. Sulphate of Ammonia, 1cwt. Sulphate of Postash	9	1	92	6	19	37	8	0	65	40	2	11	36	18	11

In calculating the value of the crop the following prices have been allowed:—

Potatoes, £5 per ton.
Superphosphate, 5s. per cwt.
Sulphate of Ammonia, 13s. per cwt.
Sulphate of Potash, 21s. per cwt.

Owing to an irregularity no yields were available from the plot dressed with 3cwts. of superphosphate and 1cwt. of sulphate of ammonia in 1932, and in order to safeguard against difficulties of this nature arrangements were made for seeding the plots in four replications in the following year.

In considering the above yields it should be noted that they represent the weights of sound marketable tubers and do not include inferior, damaged, or diseased potatoes. In this connection it is estimated that an average of two tons per acre had to be discarded in 1933. These rejects naturally have a certain value, particularly in a short year, but in some seasons are difficult to dispose of at any price.

The yields harvested from the different plots fluctuate considerably, although in both years an increased return has followed the application of fertiliser. In 1933 there was a slight addition in yield when 1cwt. of sulphate of potash was added to the superphosphate and sulphate of ammonia dressing, in each case being approximately 3½cwts. per acre.

Examination of the mean yields over the two seasons shows the maximum return, namely, 8 tons 4cwts. 48lbs., to have been dug from the area receiving 6cwts. of superphosphate and 2cwts. of sulphate of ammonia. As the no manure-plot returned 7 tons 4cwt. 94lbs., the increase due to the manuring is slightly more than 1 ton of potatoes per acre. The next highest yield is 8 tons 1cwt. 42lbs., from 3cwt. of superphosphate, 1cwt. of sulphate of ammonia, and 1cwt. of sulphate of potash plot, followed by 8 tons 0cwts. 65lbs., from the area receiving an additional 3cwts. of superphosphate, making 6cwts. of this fertiliser, together with 1cwt. each of sulphate of potash and sulphate of ammonia.

After money allowances have been made for the fertiliser and potatoes a nett return of £38 6s. 2d. per annum is shown for the 6cwts. of superphosphate and 2cwts. of sulphate of ammonia plot, or £2 2s. more than that from the no-manure plot. On the records obtained this is the most profitable manuring. However, the yields tabulated are inconclusive and except for the nett value mentioned, together with that for the 3cwt. superphosphate, 1cwt. sulphate of ammonia, and 1cwt. sulphate of potash application, the remainder are not appreciably greater than that from the no-manure plot.

Consequently, no definite recommendations can be made, but it is proposed to continue the experiment in future years and endeavour to reach some finality regarding the manuring of potatoes in these areas.

KEEPING QUALITIES.

In order to ascertain whether potatoes raised under these conditions could be stored satisfactorily and also the effect, if any, of the various manurial treatments on the keeping qualities, one bag was selected at random from the number harvested from each plot. In addition four bags of commercial potatoes were purchased, two of which originated from the Adelaide Hills and two from the South-Eastern district. The tubers thus obtained were stored in the Agricultural Pavilion at the Adelaide Show Grounds. They were placed on wooden shelves with

a good bed of straw beneath the potatoes and a thick layer on top. This occurred during the first week of June and the potatoes were allowed to remain until October 20th, when the percentage of waste was determined. By this time practically all the tubers had begun to shoot and were inclined to be shrivelled. Any exhibiting signs of decay were set aside and weighed, and it was surprising to note how few had deteriorated to this extent.

The actual figures were 0.8 per cent. decay for the Jervois potatoes and 1.8 per cent. for the remainder. However, the latter figure was influenced by a relatively high storage loss on one bag of Mount Gambier potatoes which possibly were more or less damaged in the rail journey to Adelaide. As far as the effect of the various manurial dressings is concerned no appreciable difference could be attributed to any alteration in this respect as the decay in those harvested from the no-manure plot was practically the same as that recorded for those from the area receiving the maximum quantity of fertiliser.

The results obtained therefore indicate that potatoes raised on the Murray Swamp lands possess quite satisfactory keeping qualities and are quite equal to the average commercial potato in this respect.

However, in this connection emphasis should be placed on the fact that all tubers were perfectly sound at the time of putting down. No potatoes that were damaged in harvesting or in any other manner were stored with the result that their liablity to remain in a sound condition was not affected by outside agency. Consequently, from the results obtained the assertion that potatoes raised on the reclaimed land of the Lower Murray will not keep satisfactorily appears to be without foundation.

COOKING QUALITIES.

There is no way of ascertaining the relative quality of flavour, flouriness, and other characteristics of a potato which go to make it an attractive foodstuff for human consumption without making an actual test and examination of the cooked tuber. Consequently, we are indebted to the Education Department and Miss Ellie Campbell, Inspector of Domestic Arts, in particular, for undertaking the necessary tests.

The report of Miss Campbell is as follows:—

"The tests were carried out at the Norwood Central Domestic Arts Centre.

Three methods of cooking were employed in the tests:—

(*a*) Steamed in order to ascertain the flavour unaffected by hot fat or boiling water.

(*b*) Boiled, as the most universal method of cooking potatoes and to obtain the quality of the mash.

(*c*) Baked, as another popular method of cooking this vegetable.

The following points were considered:—

1. *The Size.*—A potato of 3ozs. weight was considered the most desirable size. If the potato could be cooked and served as a whole, which is desirable, or if it would be necessary to divide the potato before cooking. The cutting of a potato into sections before cooking is undesirable for it exposes a greater surface from which the mineral salts could be dissolved, thus decreasing the food value of the vegetable. Also it was ascertained that a potato cut into sections absorbed 2ozs. weight of water whilst boiling.

2. *The Eyes.*—If the eyes were deep and required much cutting to remove them, which would cause waste. If there were few or many eyes which would materially affect the time in preparing the vegetable and the amount of waste.

3. *The Colour and Appearance when Cooked.*

4. *The Texture.*

5. *The Flouriness.*

6. *The Flavour.*

7. *The Mash.*—(Only boiled potatoes were mashed).

Points 1 and 2 give the economic value from the housewife's point of view. Ten marks were allowed for each section."

The key to the test numbers used in the following tables is as follows:—

Test No.	Variety.	Manure Per Acre.
1	Up-to-date	No Manure
2	Up-to-date	3cwts. Superphosphate
3	Up-to-date	3cwts. Superphosphate 1cwt. Sulphate of Ammonia
4	Up-to-date	3cwts. Superphosphate 2cwts. Sulphate of Ammonia
5	Up-to-date	3cwts. Superphosphate 1cwt. Sulphate of Ammonia 1cwt. Sulphate of Potash
6	Up-to-date	6cwts. Superphosphate 1cwt. Sulphate of Ammonia
7	Up-to-date	6cwts. Superphosphate 2cwts. Sulphate of Ammonia
8	Up-to-date	6cwts. Superphosphate 1cwt. Sulphate of Ammonia 1cwt. Sulphate of Potash
9	Carmen	3cwts. Superphosphate
10	Carmen	3cwts. Superphosphate 1cwt. Sulphate of Ammonia
11	Carmen	3cwts. Superphosphate 1cwt. Sulphate of Ammonia 1cwt. Sulphate of Potash
12	Carmen	6cwts. Superphosphate
13	Carmen	6cwts. Superphosphate 1cwt. Sulphate of Ammonia
14	Carmen	6cwts. Superphosphate 2cwts. Sulphate of Ammonia
15	Carmen	6cwts. Superphosphate 1cwt. Sulphate of Ammonia 1cwt. Sulphate of Potash
16	Carmen (Victorian Seed)	No Manure
17	Carmen (Victorian Seed)	3cwts. Superphosphate 2cwts. Sulphate of Ammonia
18	Up-to-date (Commercial)—Adelaide Hills	—
19	Up-to-date (Commercial)—South-East	—
20	Carmen (Commercial)—Adelaide Hills	—
21	Carmen (Commercial)—South-East	—

Test No.	Size.	Eyes.	Total.
Maximum points	10	10	20
1	6	9	15
2	7	8·4	15·4
3	3·2	9	12·2
4	4·8	7	11·8
5	9·8	9	18·8
6	4·9	5·7	10·6
7	8·2	6·9	15·1
8	5	6	11·0
Mean for Up-to-date	6·1	7·6	13·7
9	6	9·6	15·6
10	6	5·2	11·2
11	2·8	6·7	9·5
12	8	9	17·0
13	9	9·5	18·5
14	7·8	8·2	16·0
15	3	4	7
16	4	7	11
17	4·5	3·6	8·1
Mean for Carmen	5·7	7·0	12·7
Mean for Jervois Potatoes	5·9	7·3	13·2
18	8·9	7·7	16·6
19	9·8	7·7	17·5
20	7·0	8·9	15·9
21	9·8	9·6	19·4
Mean for Commercial Potatoes	8·9	8·5	16·4

In the matter of size the swamp potatoes are placed at a disadvantage, but it should be recalled that the average yield was over 8 tons per acre, and consequently the tubers developed to full dimensions.

On the other hand large potatoes are not always regarded with disfavour as they are much easier and quicker to prepare and therefore where large quantities have to be handled, such as in cafes, hotels, &c., their use results in a saving of labour. However, in the above table they have been viewed from the point of view of food value and the loss attendant with cutting.

From this aspect the mean for commercial potatoes is 16.4 points and that from the Jervois potatoes 13.2 points. So far as the two varieties are concerned there is very little to choose between them as they are both of relatively flat oval shape with similar characteristics regarding size and eyes. Very little can be said in connection with the influence of the different manurings as there is no regularity in the variations that have occurred. So much depends upon the fair average quality of the samples submitted for examination that unless a large number of potatoes are included in each, comparative figures would not be obtainable. However, from the tests made it would appear that potatoes harvested from the Murray Swamps are rather larger and with eyes a little deeper than the average South Australian sample, but these facts are not particularly important.

TABLE SHOWING COOKING QUALITIES.

Test No.	Colour and Appearance.	Texture.	Flouriness.	Flavour.	Mash.	Total. points.
	Max. points 10.	Max. points 10.	Max. points 10.	Max. points 10.	Max. points 10.	50
1	4 Yellowish on outside, but white in centre. Retains shape when baked but breaks when boiled	3 Solid. $\frac{1}{4}$in. from outside a dark fibrous	4 Better when steamed	5 Fair	1 Not fluffy, but heavy	17
2	4 Discoloured in parts, especially at eyes. Outer part very broken	5 Dark fibrous lines radiating to centre. Otherwise good	5 Outer layer very fair	6 Very fair	3·5 Smooth, but inclined to be solid	23·5
3	7 Even creamy colour. Retains shape but does not look dry	8 Firm, only a thin fibrous layer $\frac{1}{8}$in.	6 Very fair	6 Strong	7 Dry and smooth	34
4	3 Yellowish	4 Fibrous threads all through	6·5 Very fair	3 Poor	6 Dry, but not fluffy	22·5
5	6 Deep creamy colour. Better steamed or baked	8·9 Fine texture in centre	9 Good	9 Very pleasant	6·4 Very fair	39·3
6	3·8 Poor colour, dark and waxy	3·7 Fibrous layer $\frac{1}{4}$in. Centre solid	3 Poor	1 Poor	3 Lumpy	14·5
7	8 Deep creamy colour, retains shape	8·5 Very slightly fibrous, firm in centre	8·3 Good	7 Pleasant	7 Very fair	38·8
8	7 Even, yellow throughout	6 Breaks easily, fibrous threads all through	8·6 Fluffy, good	3 Poor	8 Good, but fibrous	32·6
9	8 Clear, even creamy. Retains shape	5 Fibrous all through	5 Fair	3 Poor	2·6 Poor	23·6
10	4·2 Yellowish, uneven. Outer layer breaks away	4 Firm, fibrous to centre	3 Poor	4 Best baked. Otherwise poor	4 Poor	19·2

TABLE SHOWING COOKING QUALITIES—CONTINUED.

Test No.	Colour and Appearance.	Texture.	Flouriness.	Flavour.	Mash.	Total.
	Max. points 10.	Max. points 10.	Max points 10.	Max points 10.	Max. points 10.	50
11	4·2 Dull. Uneven. Does not retain shape	4·8 Firm, with fibrous threads throughout	5 Fair	5·6-Very fair	4·5 Fair	24·1
12	9 Cream throughout. Retains shape	7 Very even. Fine but fibrous	6 Very fair	3 Strong, unpleasant	5 Fair	30
13	9·6 Even pale cream. Retains shape	6 Two distinct rings of fibrous threads	8·6 Good	7 Pleasant	6 Very fair	37·2
14	5 Some samples good colour, others poor	9 Fine and even	9·6 Good	5 Strong	8·9 Good	37·5
15	7·8 Dull in centre. Retains shape	5 Fairly fine	7·5 Very fair	8·5 Pleasant	8 Good	36·8
16	4·5 Discoloured on outside. Firm and waxy	5 Outer layer very fibrous	2·8 Poor	8 Sweet and pleasant	6 Fair	26·3
17	7 Clear even white. Breaks easily	8·6 Very fibrous when large. Smaller potatoes, fine even grains	9·2 Good	8 Good	9·4 Smooth, fine	42·2
18	4·5 Dark all through. Retains shape	4 Very firm outer layer	5 Fair	5·4 Very fair	6 Dry, but fibrous	24·9
19	7·2 Deep cream, even. Retains shape	6 Even close grain. Hollow in centre when cooked	4 Poor	4·5 Fair	4·6 Fair	26·3
20	9·8 Clear white ; few dark patches. Retains shape	9·6 Even, close. Breaks easily	9·3 Good but not fluffy	10 Very pleasant	9·7 Dry and smooth	48·4
21	8 Several very dark patches. Retains shape	8·5 Outer layer very firm	7·4 Very fair	8·2 Pleasant	9 Dry and white	41·1

In the above Table the cooking qualities of the potatoes from the varous plots have been shown comparatively with those of potatoes regularly available on the Adelaide market.

Unfortunately, the raw appearance of a potato does not always indicate its value for human consumption since this is connected with the appearance, the flavour, and the consistency of the cooked article. A good potato must yield an even creamy floury crystalline mass which is of pleasant flavour.

These requirements are dependent upon various factors as for example an abundance of starch tends to encourage flouriness whilst if the proportion is small the potato will be watery and soggy when cooked. Again, a sufficiency of protein which hardens on cooking allows for the formation of a framework which holds the starch lightly together so that the potatoes retain their shape, giving them a crystalline attractive appearance. In addition, the flavour will vary according to the variety, soil, and other conditions but in all cases it is essential that it be full and pleasant. Some potatoes are slightly acid, others again are inclined towards sweetness, whilst green-ness, due to exposure or the formation of sprouts, causes the development of unpleasant flavours.

Because of these facts it was necessary to carry out cooking tests in the effort to determine how potatoes produced, under such conditions, compared with those offering in Adelaide and also to endeavour to ascertain whether any variation in manuring would have influence in this direction.

Considering the tests first of all from the point of view of the variety, that is to say, tests No. 18 and 19, representing Up-to-Date variety, and Nos. 20 and 21, Carmen variety, secured from the Adelaide Hills and South-Eastern districts in each instance, it would rather appear that Carmen offers superior cooking qualities. In this respect the Carmen from the Adelaide Hills was almost perfect and Miss Campbell awarded it 48.4 marks out of a maximum of 50.

In the case of the manurial trials the tests were replicated in practically all instances, and therefore in the following table the results obtained from each replication together with those for the commercial potatoes have been averaged:—

Test No.	Manure Per Acre.	Colour and Appearance.	Texture.	Flouriness.	Flavour.	Mash.	Total.
	Maximum—	20	20	20	20	20	100
1 & 16 ...	No Manure	8·5	8·0	6·8	13·0	7·0	43·3
2 & 9	3cwts. Superphosphate......	12·0	10·0	10·0	9·0	6·1	47·1
3 & 10 ...	3cwts. Superphosphate...... 1cwt. Sulphate of Ammonia .	11·2	12·0	9·0	10·0	11·0	53·2
4 & 17 ...	3cwts. Superphosphate...... 2cwts. Sulphate Ammonia ..	10·0	12·6	15·7	11·0	15·4	64·7
5 & 11 ...	3cwts Superphosphate ...... 1cwt. Sulphate Ammonia.... 1cwt. Sulphate Potash	10·2	13·7	14·0	14·6	10·9	63·4
12	6cwt. Superphosphate	18·0	14·0	12·0	6·0	10·0	60·0
6 & 13 ...	6cwt. Superphosphate ...... 1cwt. Sulphate Ammonia ...	13·4	9·7	11·6	8·0	9·0	51·7
7 & 14 ...	6cwts. Superphosphate...... 2cwts. Sulphate Ammonia ..	13·0	17·5	17·9	12·0	15·9	76·3
8 & 16 ...	6cwts. Superphosphate...... 1cwt. Sulphate Ammonia ... 1cwt. Sulphate Potash	11·5	11·0	11·4	11·0	14·0	58·9
18 to 21	(? Commercial Potatoes)	14·8	14·0	12·9	14·0	14·7	70·4

Whilst it is not possible to arrive at any definite conclusion from such a limited series of experiments, several very interesting features appear to be indicated in the above Table.

In the first instance it will be noted that the lowest number of points have been gained by the potatoes that were planted without manure. This sample was awarded 43.3 per cent. and it would therefore appear that fertilisers play an important part, not only in promoting an increased yield, but also in the improvement of the cooking quality of the tubers produced.

Superphosphate has had influence in giving the cooked potatoes a clear creamy colour causing them to retain their shape, thus producing a more attractive appearance.

Sulphate of potash has apparently led to an improvement in flavour as in one instance the addition of this manure has increased the points for flavour by 3.6 and in the other by 3 in a maximum of 20 points for the division. It also appears to improve the texture but at the same time tends to give the potatoes a yellowish colour which is a disadvantage.

The potatoes with the best cooking qualities were obtained from the plot receiving 6cwts. of superphosphate and 2cwts. of sulphate of ammonia per acre. 76.3 marks were allotted to this sample, which was good in every section, but gained the highest points throughout the whole series for texture, flouriness and mash.

Next in the order of merit was the sample from the 3cwts. of superphosphate and 2cwts. of sulphate of ammonia plot, which was awarded 64.7 per cent. and also received high marks in the same three sections as the preceding sample.

Examining the cooking qualities of commercial potatoes it is interesting to note the regularity of the points allotted. In every instance, that is to say, in each section, they represent fair average quality and consequently provide a useful basis for comparison. From the results obtained it would appear likely that on the average potatoes harvested from the Murray Swamp lands will not equal those from other areas in colour, appearance, and flavour, but, on the other hand, will provide a foodstuff with better texture, flouriness and mash.

However, in a number of the tests they have proved quite satisfactory and there is every possibility that when efficiently grown and properly manured, tubers from these areas will tend to improve the general average quality of South Australian potatoes. As an example it may be pointed out that the crop receiving 6cwts. of superphosphate and 2cwts. of sulphate of ammonia gave a cooking test of 76.3 per cent., comparatively with 70.4 per cent. for commercial potatoes.

In connection with quality, emphasis must be placed on the necessity of thorough and careful cultural operations. Under the swamp conditions excessive moisture is a danger and a likely cause of damage, not only to the yield, but also to the quality of the tubers harvested. Regular and effective control of weeds, full hilling up of the plants and intercultivation between the rows, together with many other aspects associated with the growing of potatoes, need to be very carefully watched if success is to be attained and unless the intending grower is prepared to undertake these duties he should abandon the idea of planting this crop on the Murray swamp lands.

So far as manuring is concerned, it will be recalled that the greatest nett profit was gained when the crop was fertilised with 6cwts. of superphosphate and 2cwts. of sulphate of ammonia per acre, and in the last Table it has been shown that this same dressing has led to the production of tubers of the highest cooking quality. Moreover, these potoatoes were of good average quality in the matter of size and eyes, whilst they did not unduly deteriorate when stored.

It is therefore recommended that this dressing be adopted for potatoes planted on the reclaimed areas, but at the same time growers must keep prominently in mind the fact that careful irrigation and thorough cultural operations are of greater importance in the production of profitable good quality crops than any manurial dressing they may apply.

From the foregoing results it can be concluded that potatoes may be profitably grown on the swamp lands of the Lower Murray, but, as has already been pointed out, any expansion in the cultivation of this crop can only be possible if heavier yields and tubers of superior quality to those commonly available to-day are harvested. In this event growers in less favourably situated areas would not be in a position to compete and would ultimately have to cease operations.

However, unless disease, seepage or some other unforeseen factor interferes there is every reason to anticipate that sooner or later the Murray swamps will produce much of the State's requirements for potatoes.

Moreover, these areas would lend themselves to easy grading and inspection of the crop, thus resulting in the improvement of the quality marketed comparatively with that regularly offered at the present time.

The experiments conducted have involved a good deal of work and in conclusion, it is desired to place on record, our appreciation of what has been done by Mr. J. W. E. Schultz in the growing and harvesting of the crop, and by Miss Ellie Campbell in conducting the cooking tests.

AGE AT WHICH TO SELL PIGS.

Miram asks, "What is the most profitable age to sell pigs?"

Mr. H. B. Barlow (Chief Dairy Instructor), in reply, says that the most profitable age to sell pigs will depend wholly on local circumstances. Generally speaking, pigs are sold as weaners (8 weeks), porkers 3½-4 months), or baconers (4½-5½ months).

"I do not think any special age can be said to be the most profitable age, but the younger you can sell a pig and still obtain the top price, naturally the better the returns.

Pork pigs, weighing about 60-80lbs. dead weight, usually show about ¼d. to ½d.* per lb. better price than baconers weighing 120-130lbs., but the cost of freight, handling, and selling is usually the same in each case, and this may more than compensate for the price difference.

The large variations in price is not a question of age, but rather of type and condition of the pig.

Everything else being equal, the heaviest weight at which you can receive the maximum price per lb. will be found more profitable for the producer, but at the same time a bacon pig for the local market should not weigh more than 130lbs. dead weight, and should be procurable at not more than 5 to 5½ months of age if properly fed."

VALUE OF SUNFLOWER SEEDS.

The Mypolonga Branch of the Agricultural Bureau asked: "What is the feed value of sunflower seeds, and what is the best method of feeding same?" In reply, Mr. W. J. Spafford (Deputy Director of Agriculture) advises that although sunflower seeds contain a fairly high content of fibre (23 per cent.), they are a really good foodstuff for farm livestock, both animals and birds.

The starch equivalent figure for sunflower seeds, which is the guide to fattening properties, is 95.5, whereas wheat is about 77, barley about 78, and oats about 63. The nutrient ratio, which indicates milk-producing powers, is 1 to 5.2, against about 1 to 10 for wheat and barley, about 1 to 8 for oats, and about 1 to 3 for pease.

Sunflower kernels, which comprise about 55 per cent. of the seeds, have a starch equivalent of 122.5 and a nutrient ratio of 1 to 4.2. Sunflower seeds can be fed whole to all farm animals without injurious effects, and will be readily eaten by livestock if mixed with chaffed forage.

ACTIVITIES AT ROSEWORTHY AGRICULTURAL COLLEGE, 1933-34.

PART IV.—THE SILAGE HARVEST—METHOD AND ITEMS OF SPECIAL INTEREST.

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.), Principal, and O. BOWDEN, R.D.A., Farm Superintendent.]

With the risk of a certain amount of repetition, it is intended in this article to review the silage harvest of last year. In doing so, it will be necessary to incorporate some of the leading features of the previous season's operations, wherein experience was gained which led very largely to the successful and unusually large silage harvest of 1933. So that although this constitutes part of the report on activities for 1933-34, it actually summates the experience of the last two silage harvests; in fact, as far as silage stack building is concerned it is a record of experimental work, the results of which are considered to be of far-reaching importance in South Australia. Under the special circumstances and also in view of the increasing interest in this method of conserving fodder, a detailed account of the work is given.

THE NEED AND VALUE OF SILAGE.

At the outset a cursory interpretation of the actual need and value of silage is not out of place, for although the story has been written and told many times before, through constant repetition and insistence on the urgency of the need and the uniqueness of the value of silage, it is hoped that each year's figures will relate a substantial increase in the amount made in South Australia, until it is universally accepted as an indispensable means of fodder conservation. Actually the conditions which prevailed in our State during the first six months of this year must have emphasised more effectively than can be done by any other means the absolute necessity of fodder conservation on all farms where livestock are a feature. The desirability of livestock entering into the farming system has already been emphasised in the first of these reports, and there can be no doubt that the conservation of suitable fodder reserves is the fundamental factor at present involved to make such a practice wholly sound and reliable. It can only be partially successful, and fraught with the possibilities of occasional failure, where stock are maintained, yet called upon to subsist over lean periods on pastures, that, besides being scanty, have lost palatability, nutritive value, and all vestige of succulence.

The urgent need of the moment is to build up adequate reserves, firstly as an insurance against loss of stock, and, secondly as an insurance against serious decline in production. The first of these does not necessarily involve silage, for it is more a matter of maintenance, and for this purpose hay and grain can be, and should be, conserved to fill the requirements. The second factor concerns both maintenance and production; this can only be fully satisfied by the conservation of fodder which will combine nutritive value with succulence. If it were only a matter of maintenance or even fattening, then reserves of dry fodder and concentrates might well be advocated, but when milk production comes into the matter, and when the modern insistence on continuity of supply of primary products is given consideration, then dry feed in itself is not enough. This is especially true where cows and ewes suckling lambs are concerned, and silage as a succulent feed of known milking producing capacity is the only form of conserved fodder which really satisfies the needs.

During recent years there has been a marked increase in dairying; yet this year the dairy farmers are unquestionably in a serious plight and have lost as much as 40 per cent. of their normal returns because of the serious decline in actual production. The loss in the fat lamb industry has been equally serious because the owner has risked the chance of seasonal failure. To safeguard this increased production, to make sure of its continuity, and even to increase it, the preservation of green fodder in a succulent, nutritious condition becomes fundamental in a climate such as ours. The only answer at the moment is silage, for the evidence is conclusive that as a feed it answers the purpose of succulent feed for milk production, whether it be in the dairy cow or the ewe suckling lamb.

Very much more might be written on the need and value of silage, but nature itself has already this season brought examples of both the need for it and its value into sharp relief far more effectively than all the writing that might be done here. The work during the last two years at the College, in demonstrating by stack building the ease of its manufacture, as well as its value as a foodstuff, has already been widely appreciated, but appreciation is not enough, unless those appreciating are stimulated into activity in the matter.

THE PRESERVING PROCESS AND GENERAL PRINCIPLES.

Before entering into the details to follow, for the benefit of those not well versed in the process of silage making, a brief introduction to the salient principles involved, together with their practical implications, will be useful, and make later observations intelligible and more self-explanatory.

Illustration 1.—The knife bar of the mower with the curved iron rods attached. This was used in cutting self-sown clovers and cereal.

Silage is green fodder preserved in a succulent, nutritious condition by a process of *controlled fermentation.* If this fact is carefully borne in mind, many points which arise in practice would receive the commonsense interpretation they deserve, and much of the fuss and bother over what should and what should not be done would be eliminated, thereby removing confusing details and unwarranted technicalities from the mind of the farmer. The process is straight-forward, but it is one of *controlled* fermentation.

When any quantity of freshly cut green plant material is massed or heaped together, the first obvious change is a very rapid rise in temperature. The initial rise in temperature is due to the procedure of normal cell activity, but fermentation very soon follows. The accumulation of carbon di-oxide and the exclusion of air, which is essential to make good silage, destroys all life in the cells of the fodder, but under such conditions certain bacteria thrive. These

bacteria obtain the oxygen required for their existence from chemical compounds contained in the cell sap, and until a certain temperature is reached lactic acid bacteria are extremely active.

It should be remembered that the organisms which produce the preserving acids cease to do so at a high temperature, and the amount of acid produced will depend on the length of time at which the silage remains below a certain temperature (130-140 deg. Fahr.); this defines the quality of the ensilage and the efficiency of its preservation. The object should be to prevent excessive temperatures altogether, thereby prolonging lactic acid fermentation until finally checked, partly through the depletion of raw materials supplying the requirements for active fermentation, and partly as a result of the accumulation of substances which are toxic to bacterial life and which inhibit further activity.

Translating this very brief outline of the process into practice, it can be summarised in one sentence. The object should be to fill the silo, or build the stack, rapidly, using only freshly cut green fodder, and to bring the necessary pressure to bear to exclude air and cure the fodder with as little waste as possible and so preserve it in a succulent, green, and nutritious condition. *From this two main considerations present themselves, the first concerns the state of succulence*

Illustration 2—The rods attached to the mower worked effectively, the cut sward was rolled into a light wind-row, which greatly facilitated subsequent handling.

in the fodder, and the second the exclusion of air. If due emphasis is given in making silage to these two factors all the difficulties concerned will be overcome.

The fodder must be cut while it is still green and succulent and when maximum bulk can be expected. Whatever the plant, this stage is reached at flowering and continues after flowering up to the stage when the developing seed is still soft and milky. Later than this the plants begin to dry, they have insufficient succulence, and serious failures often result. So, as a general rule it is fundamental to begin silage cutting early, so that the final cuttings will be made while the fodder is still succulent. If the dough stage has been reached in cereals, for instance, the fodder is too dry and should be cut for hay rather than ensilage. In building stacks it is wise to use material of a more succulent nature than might be placed in a silo; it is important in fact not to attempt to make stack silage with comparatively dry material. If the fodder is too dry, fermentation is retarded, there is greater difficulty in excluding the air, overheating results, and the plant tissue becomes less nutritious, and may even become seriously charred

and a complete loss. For the best results, therefore, it is advisable to start early while the plants are fresh and green, even if the optimum stage has not been reached, rather than to commence when the optimum stage for cutting has been reached and finish up with dry over-matured fodder. There is a danger of this under South Australian conditions, where crops are apt to ripen off very suddenly during the spring and early summer. As a rule only as much crop as can be put into the stack or silo in the day should be cut, for fodder that has wilted makes inferior silage to that in a freshly cut condition.

The second great consideration is the exclusion of air, and this involves several of the most important practical points. It implies at the outset that everything possible should be done to make the fodder pack as closely, as tightly, and as evenly as possible; this in turn implies the application of weight or compacting pressure of some sort. Now in building stacks the easiest and most efficient means of applying pressure is to use the fodder itself, and from this one reaches the

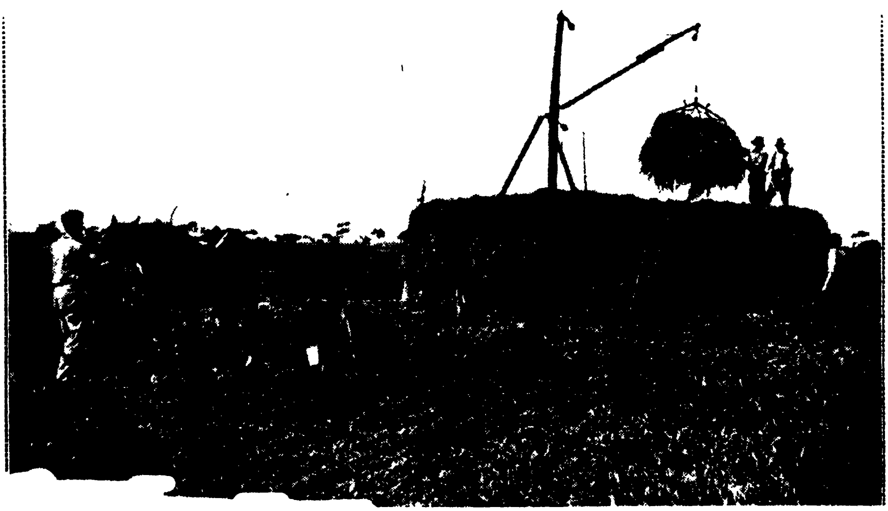


Illustration 3.—The grab-stacker is here shown lifting a load of fodder on to the stack.

golden rule of silage stack building, and that is don't sacrifice height for base room. By building on a small base and aiming at greater height the foundations of success are laid. In the case of a trench silo the pressure can be exerted easily by artificial means such as tramping with horses, or drawing a load on to the fodder, consequently depth in the trench has not the same significance as height in the stack.

The rapid building of the stack or filling of the silo is then desirable so as to bring pressure to bear upon the material as quickly as possible with the object of controlling temperature by excluding air and so extending the period of fermentation. This will result in the production of a desirable sour type of silage of good colour and odour. Dealing with sheaved cereal material, which being rather stemmy, is more difficult to pack than loose pasture especially clover or lucerne, weighting is necessary after each day's work to make the exclusion of air more rapid and certain. Then again if the fodder is on the dry side a liberal sprinkling with water, especially in stack building, will be found of great assistance.

THE SILAGE HARVEST OF 1933.

The total harvest of silage last year was easily a record for the College, and was made up from 490 tons of cereal, which was sown for the purpose, and 240 tons of self-sown material from Days A and B, a paddock that had been cropped to cereals the year before and which was being rested as ley land. This made a total harvest of 730 tons, and it was conserved as shown below:—

Silage Harvest, 1933.

Method of Conservation.	Material Used.	Source.	Weight Harvested.
Overhead Silos of reinforced concrete	Sheaved Oats and Barley, chaffed and blown into the Silos	Old fence plots and 5A. Now known as No. 5	300 tons
Stacks—			
(a) Two round stacks of loose fodder	Volunteer growth consisting mainly of Burr Medic (or Burr Clover) with admixture of self-sown wheat and oats	Days A and B	240 tons
(b) Pole-guided stack of sheaved cereal	Sheared oats and barley ..	No. 5	100 tons
(c) A round stack of sheaved cereal	Sheaved oats and barley ..	No. 5	90 tons

It is not for one moment suggested that such enormous quantities are required in the normal course of events, but when seasons of plenty do occur the very fullest advantage possible should be taken of them. Only by this means can a safe and sound policy of livestock management be carried out in an environment as notoriously unreliable as the one under which we, in South Australia, work. Poor seasons are inevitable, just as good seasons are; the only way to ensure an even tenor of production and to guard against failure is to utilise to the fullest extent the bounteous growth of favourable seasons. Every effort was made at the College last year to put this policy into practice, and as much fodder as could be handled was conserved. The sense of security and actual value of this was very soon exemplified, for the present season necessitated an unexpected early call on these reserves.

Under ordinary circumstances about 300 tons of silage are required at the College each year. This is because livestock feature so largely in conjunction with cropping, and ample provision must be made to tide over the regular summer shortage of paddock feed. Consequently it is customary to sow special areas of cereal for the purpose, or utilise certain areas of the season's crop. The decision to sow the 70 acres already referred to in the general harvest report was made because the reserves on the property at the close of 1932 were fairly low and offered no sense of security. The details of preparation, growth, and yields from this area have already been given.

Similarly, the source of supply of self-sown fodder from the fields Days A and B has already been detailed. It might be stated here, by way of emphasis, that such a luxuriance of feed might quite easily have been fed during the year, but in this way it could not have been utilised to anything like the full extent of its value. In fact the proper utilisation of it, without considerable wastage, would have been difficult, but converted into silage and hay, as it was, not only meant that fuller feeding value was obtained, but even as an insurance policy its worth was greatly enhanced.

The gathering of the fodder was quite a big undertaking, but the nature of the season was such that an early start was made and all operations connected with silage were completed before hay cutting was commenced. The volunteer growth in

Days A and B was taken off and stacked first; these operations beginning during the first few days of September. The overhead silos were then filled, followed by the pole-guided stack, and finally a round stack of sheaved fodder.

CUTTING AND HANDLING THE FODDER.

Sheaved Fodder.—The actual cutting, and handling of the fodder from the field to the silo, are matters of particular practical importance, as certain difficulties present themselves. The fact that the fodder has to be handled while still green and succulent complicates the whole position. It is of greater bulk, and considerably heavier than if handled as hay, and it is often cut before the ground has

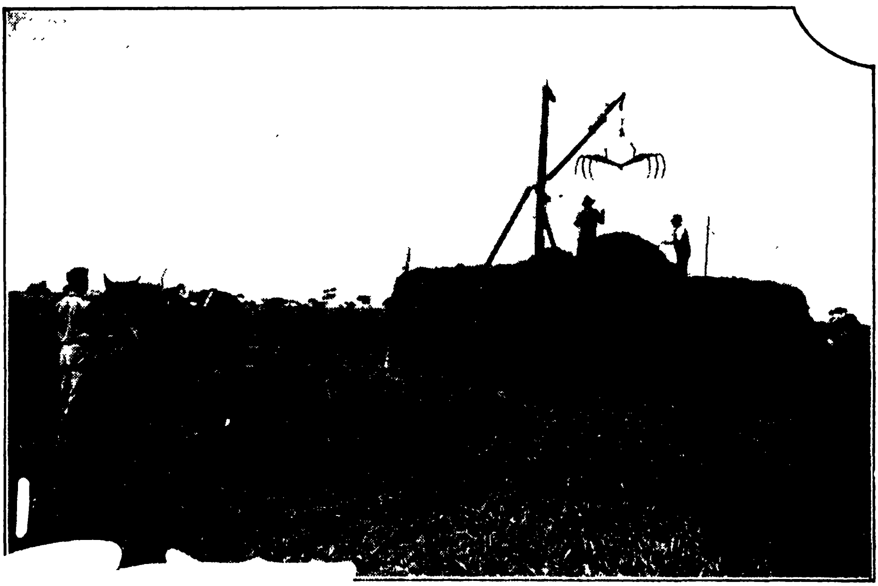


Illustration 4.—The same load just dropped; the grab is open ready to be swung out and lowered for the next haul.

dried out properly after the winter rains and while undergrowth is still at maximum bulk and still very sappy. For the last two seasons now, some trouble has been experienced in binding the cereal crop meant for ensilage. These difficulties, however, are not insuperable and normally only present themselves during the first week of operations when both ground and fodder are damper than later on, but a note here may save endless trouble for someone. With the damp conditions and the heaviness of the normal sheaves, the load on the machine is heavy, causing the big wheel to slip, whereupon the machanism ceases to operate and the fodder jams. Experience at the College is that this can be overcome sufficiently well, provided the binder is in good general condition, by keeping the knife sharp and making provision to bind smaller sheaves. It is considered that by fitting an auxiliary engine to the binder to relieve the load it would be quite possible to work under all conditions likely to occur.

Once bound, the subsequent handling of the material was comparatively simple, though such work is considerably heavier than handling sheaved hay or sheaves meant for threshing. Normal procedure was to cart directly following the binder, no preliminary stooking of any kind being necessary, as the fodder was ensiled the same day as it was cut.

Loose Fodder.—Where the binder is impracticable, such as in clover or lucerne, the only available machine is the mower. The area of self-sown material harvested at the College last year was chiefly Burr Medic, or Burr Clover as it is commonly called. This formed a dense growth about a foot high and was fairly typical of the growth common on areas of subterranean clover.

The ordinary mower leaves the green fodder in a rather unsatisfactory way for further handling, and to alleviate this a series of curved rods was attached to the mower knife bar. These rods were placed 9in. apart. Each succeeding rod was longer than its neighbour, with the longest immediately behind the machine as the first illustration shows. This device delivered the cut sward in a roll approximately a foot thick, which is well depicted in the second illustration. The action of the rods was very interesting, and they operated with greater efficiency than at first anticipated.

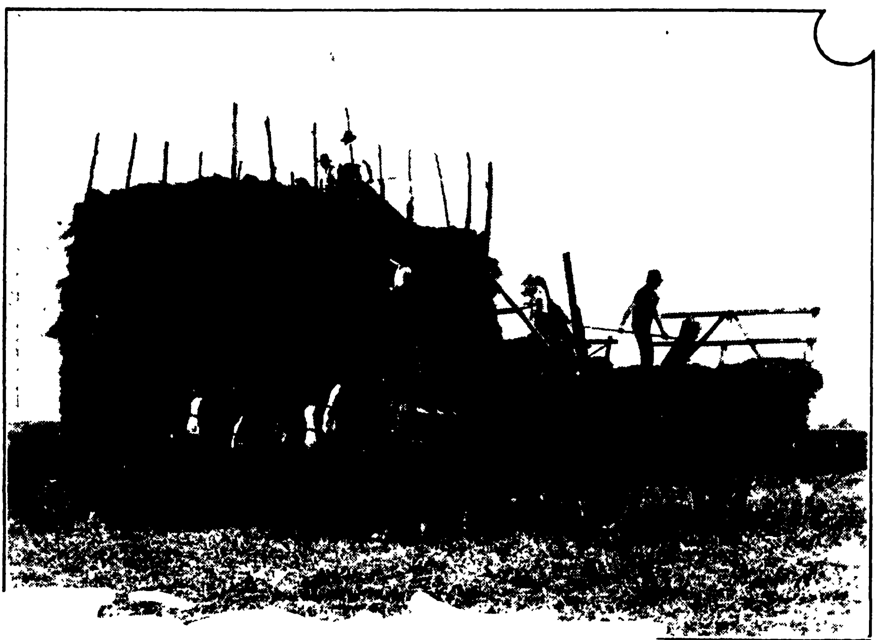


Illustration 5.—The first pole-guided stack built at the College. Note the sheaf heads hanging over the end of the stack in alternate layers. Lower down these have been chopped off and thrown into the centre of the stack.

The rods were all attached to the knife bar by boring holes in the back of the bar, the shortest of which was attached so that it just missed the end of the outer dividing board and was then hooked upwards. The result was that the partial turn, obtained when the sward was pushed across by the outer board, was completed by this rod; succeeding rods then continued the turn until the sward was rolled clear of the last and longest rod behind the machine. This had distinct advantages; the horses did not trample on the material in the following round and the sward was also more accessible for picking up and for loading on the sweep rakes. The sweep rakes used for the work were made at the College and saved a tremendous amount of heavy lifting. Unfortunately the ground was rather too wet and generally uneven to enable the sweeps to sweep in the fodder as originally intended. A little was gathered in this way, but for the most part

the sweeps were loaded, then hauled to the site of the stack and tipped. A grab stacker, working at from two to three minute intervals and taking 4cwts. to 5cwts. at each lift, dealt quite effectively with the loads being delivered by the sweep rakes. Illustrations 3 and 4 are photographs of the grab and tackle at work.

In describing the ensiling of the fodder it will be expedient to deal with the methods separately, but as the filling of the overhead silos was done in the ordinary routine manner, no special mention need be given here, especially as there is nothing new to cite. Obviously initial expense rules the overhead silo out of consideration, except where reserves are stored for dairy cattle or stud stock, and where it is regularly used and refilled every season.

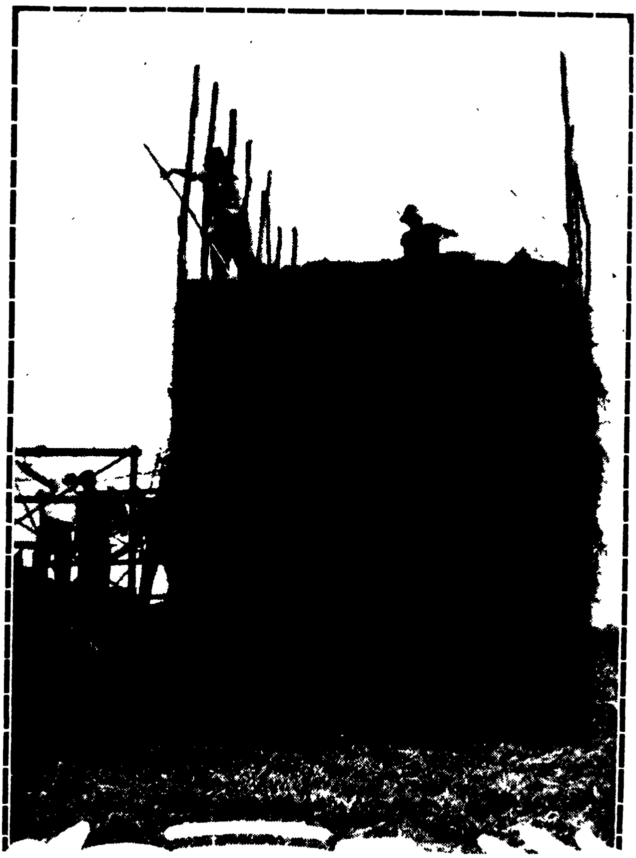


Illustration 6.—An end view of the pole-guided stack. The builder, it will be noted, is placing all the sheaves in parallel fashion, the heads facing the camera. In the previous layer built the butts face the camera, and so on.

Out of justice to the trench silo system, however, it should be mentioned that where a suitable site and conditions are available the trench offers many advantages. At the College, however, two factors make the trench silo less attractive; firstly the flatness of the country with no guarantee of good drainage, and secondly, the limestone soil, with rubble-like subsoil on all sites which are satisfactorily drained, would necessitate lining of the trench to make the walls permanent and suitable. For this reason some cheap and effective means were

C

sought. The following descriptions of the stacks built at the College during the last two years record the experience gained, and indicate that stack ensilage of good quality and low manufacturing ... use and at low cost.

TH...

This method was first tried at the College in 1932; it proved an unqualified success and last year it was successfully repeated. The method has so much in its favour that its further use is being more fully and permanently exploited to the extent of putting up permanent frameworks which may be regarded as stack

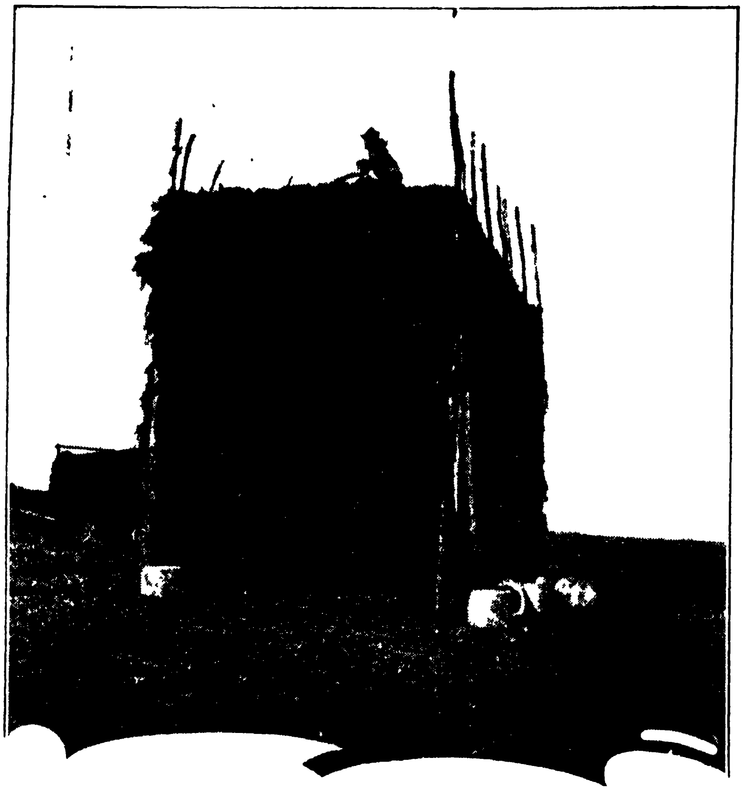


Illustration 7.—A general view of the pole-guided stack nearing the top of the poles for the first time. Note particularly the tarpaulin used to protect the windward side, and the old concrete horse-troughs on the ground, which were suspended by wires thrown over the stack and thus used as weights after each day's work.

silos. The system is to build a framework of poles of reasonable strength and rigidity along both sides of the stack. The poles used at the College were cut from a plantation of gum trees on the property. The rectangular frame used was designed to hold from 90 to 100 tons, and the dimensions were 21ft. by 12ft. and the poles were 22ft. out of the ground. Along the two sides, the long poles (of from 6in. to 8in. in diameter) were placed firmly in the ground 3ft. apart; eight poles were thus required for each side. Opposite poles were braced by wires across the top of the stack.

For a farmer in a position to get long poles conveniently, a stack frame of the dimensions 21ft. by 14ft. 6in. would probably be more manageable; the increased base-room being necessary to reduce the height slightly. If a stack

built in a framework of the dimensions suggested is raised to a height of 20ft. and filled to that height, say, three times after allowing for settling, 100 tons of ' ...ed cereal greenstuff would be required.

This type of stack for sheaved cereal fodder respects the principles of ensilage manufacture in a way that no other stack of similar material does. It offers several distinct practical advantages as well, but its greatest advantage lies in the fact that it enables the stack to be built with sheaves set in parallel fashion, and not with the butts to the outside of the stack, except at each end, and then

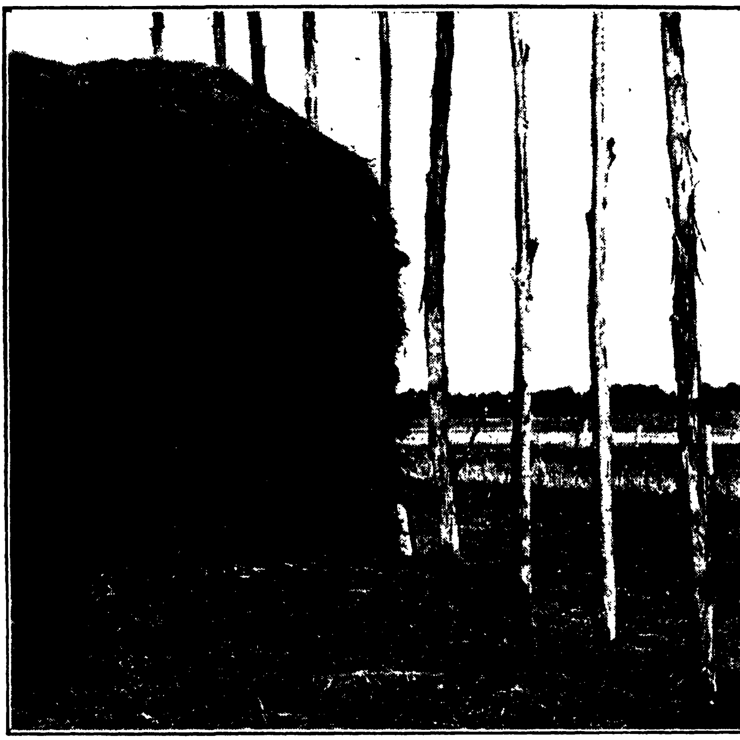


Illustration 8.—This shows the pole-guided stack as it opened. Note how compact and solid the silage is, and how little the margin of wastage extends into the bench.

only in alternate layers. When building the stack it was found very advisable to lay one layer of sheaves with the heads all facing one direction and all parallel to the sides of the stack, the next layer with the heads facing the opposite direction, and so on, so that at each end the heads were allowed to protrude over the end edges of the stack in alternate layers. These were then trimmed level with the butts of the alternating layers and thrown back into the middle of the stack. This feature of the stacking method is illustrated in the photographs.

Actually the parallel stacking of the sheaves is made possible by the poles, and this is undoubtedly the most important attribute of the method, for such parallel stacking of the sheaves enables much better compaction and it guarantees the exclusion of air quicker and far more effectively than if the stack were built on the haystack principle, where sheaves are criss-crossed to bind them together. Further, the poles facilitate building and make the chances of serious slipping

of the stack during bu... [illegible] ...n this respect the chances of slipping will [illegible] ...me, but provided reasonable care in building is taken, very little trouble need be feared.

In building the pole-guided stack about 20 tons of green fodder were being dealt with each day. This in itself [illegible] ...ght and pressure on under layers; even so, with this type of stack, it was considered necessary to apply additional weight overnight following each day's work. To do this four planks were thrown on top of the stack, two being set along the two long edges. Wires were then thrown over the stack and rested on these planks and weights were suspended on the ends of the wires. For the purpose old concrete horse troughs were used, but any heavy logs would fill the bill quite well. The method adopted was to roll the weights on to empty trollies on either side of the stack, attach the wires, then on removing the trollies the weights were suspended to bring pressure upon the stack. The experience gained indicates that if proper attention is given to weighting during building much of the need for heavy final weighting is overcome. Actually in the case of the first stack built at College on this principle the same weighting was used after the stack was finished as had been used during the building with quite satisfactory results. Certainly if the stack is intended to stand as a reserve for longer than six or eight months, more substantial weighting is advisable.

Stacks of sheaved cereal fodder can be made without the poles. These have to be built in much the same way as a haystack, and the experience gained at College over the past two years has been sufficient to indicate that such stacks of silage are easily the most difficult to build. A rectangular or nearly square stack was tried in 1932 and a round one last year, and although the round stack gave less trouble through uneven settling and tendency to slip than did the square type, both showed wide bands of wastage and the manufacturing loss was high. In contrast to both, in the two years the pole-guided stack stood out in very sharp relief, the marginal loss was very slight (Illustration 9), and the manufacturing loss surprisingly low. In respect to the latter the loss due to manufacture in the 1932 stack was actually ascertained by chemical analysis and found to be no greater than in the silage made in the overhead silos (in fact the figures indicated a slightly better result in the stack). Apart from the difficulty of maintaining even settlement in stacks built on the haystack principle, it is practically impossible to drive the air out on account of the locking and crossing of sheaved bundles. This is the real cause of marginal and manufacturing loss, and the most successful way to overcome the trouble is to build on the parallel system as suggested in the pole-guided stack just described.

THE LOOSE STACK.

The gathering of the fodder by means of the mower with rod attachments, sweep rakes, and grab stacker has already been described. For handling pasture, clovers, or lucerne as loose material, the method is unhesitatingly recommended, and it will be found to be quick, economical, and easy.

For the work under review a convenient and yet reasonably well drained site was chosen for stacking, and here the grab stacker was erected and a base of 24ft. in diameter prepared. In choosing the site convenience of handling the fodder was considered, and this is an important point, for quick building is often the essence of the contract. Besides facilitating the handling, it is cheaper and more economical of labour than carting the fodder out of the paddock to meet any feeding conveniences which might suggest themselves.

The trouble of keeping sheaved stacks from uneven settling is not so pronounced in stacks built of loose clover material, and in the stacks built at College there was, if anything, a draw to the centre, where more rapid settling appeared

to t..... place. This rather quick settling in the middle had a tendency to pull the ...es inwards and some heaping in the centre was found advantageous during the later stages of building. Apart from this, the usual practice in silage making of keeping the surface practically level during the building was followed, hearting up taking place as the stack neared completion, and as a final mounding up.

In all silage stack building at the College the side exposed to the prevailing wind is protected by a tarpaulin; this saves endless trouble due to the temperatures of one side of the stack being greater than those on the other, which induces, quicker than anything else, uneven settling, which is invariably accompanied by a tendency to slip. No trouble was experienced with the two loose stacks built and they were both brought to the maximum height of the grab (about 18ft. to 19ft.) on three occasions before they were closed and weighted down.

The first stack built was made of particularly succulent fodder and seepage and general weeping of moisture set in before the stack was finished. This increased and continued for some time after the stack was weighted down. With this oozing of juices from the stack a very objectionable odour developed as soon as it made contact with the air. This odour persisted for about two months and is to be expected from leguminous fodder made into ensilage when portion is exposed to the air, as is the case in a stack. Normally fodder rich in proteins makes a product of higher odour than that rich in carbohydrates, but well made it is never objectionable, except in the manufacturing process when seepage or outside portions of the fodder are exposed.

The second stack was slightly smaller than the first and it was built slower, because labour was not available regularly during the Royal Show week. The fodder was also drier, and the lack of labour to assure quick handling meant at times rather serious drying out of the material, but this was rectified by the liberal use of water which was sprinkled over the fodder during the course of building. When delays did occur this stack was weighted down pending a continuance of operations, and before it was finally closed 11 days had elapsed from the time of commencement. There was also seepage from this stack and a high odour accompanied the manufacturing process.

The above facts are stated in connection with this second stack as it has since been opened, and although some defects in the fodder might have been explainable, none required any explanation. It proved to be first class, and dry stock even consumed the darker outer margins which might legitimately have been considered wastage. Experience from this result make it possible to state here, that, provided adequate care is taken to weight down during the intervals, the stack can be left for a day or two, and that at least 12 days can be taken with safety in handling 120 tons of similar fodder in this manner. Further, objectionable odours and heavy seepage from the stacks do not infer bad silage; rather, the reverse, for the bad odours are accompanied by seepage which helps to seal the stack and seepage indicates, amongst other things, that the air has been effectively driven out of the fodder.

GENERAL HINTS ON STACK BUILDING.

Having outlined the method adopted at the College in silage stack building a few general hints applicable to ensilage ensiled in stacks may be useful.

Under no circumstances can the sides of an ensilage stack be built out as is allowable and attractive in haystacks. The stack should be narrowed in gradually as it is being built, that is, with the sides just off the perpendicular, sloping inwards. In the pole-guided stock, of course, they should be perpendicular, but here the poles prevent slipping. Great pressure is exerted on the fodder below, and unless the sides are perpendicular or broadening at the base trouble will accrue as the settling takes place.

When building great attention should be paid to the walls and corners of the stack to see that they are well compacted. The centre of the stack should be kept full, but not hearted up as in the haystack, the idea being to keep the surface as near level as possible and the walls and corners as firm and tight as possible.

Uneven drying and uneven temperatures in the stack may be brought about by wind on the one side drying it and driving the temperature to the other side. This causes uneven settling, and uneven settling above everything else must be guarded against or the stack may slip so seriously as to topple over. If a large tarpaulin is used to protect the sides of the stack from the prevailing wind, this will be found not only efficient, but actually indispensable in some cases. Great care should be taken to build evenly, even layers of fodder should be evenly distributed.

Illustration 9.—A close-up of the base of the open pole-guided stack, showing the very small margin of wastage and the dense compaction of the silage in the main part of the stack.

The matter of weighting down after the day's work will depend upon the amount of fodder built on each day. At least 6ft. of fodder should be added daily for good results. This in itself is another good reason for keeping the base small. In a loose stack of clover or lucerne, or fairly fine pasture, weighting down every day may be dispensed with, but with stacks of sheaved fodder it is essential. For the purpose, the use of weights suspended from wires thrown over the stack at intervals of at least every 4ft. will be found convenient. Special attention should be directed to see that a wire is run close to the edges of the stack. Under the wires on top of the stack throw a few poles or planks; this distributes the weight evenly, which is important.

Top the stack off, allow for settling, retop, and repeat, say, three or four times.

The whole should then be weighted down permanently. The recognised formula for weighting down is 1cwt. per square foot of surface. The weights used and the manner of weighting will depend upon the type of stack and whether it is intended to open the stack early or leave it for a longer period. At College, stacks are not expected to stand for very long, consequently the weighting is more temporary than would be the case if the fodder were to be held in reserve for a longer period. For the purpose at College heavy wood is piled on top. The advantage of this is ease of handling, stone, sandbags, earth, or other heavy material may be used, and for a more permanent weighting a framework of sandbags or stones round the outside to hold extra weight and make sure of distributing it right to the margins of the stack is desirable.

APPROXIMATE COSTS.

To many farmers the subject of ensilage brings to mind a gloomy picture of hard labour and imaginary high costs. Yet this year one might venture to assert that many are already conscience stricken and financially poorer for not having taken the matter seriously and placed some fodder in reserve when it was plentiful. The man who makes silage instead of hay is never tempted to sell his reserves when prices do rise, and when others are paying high prices for feed,

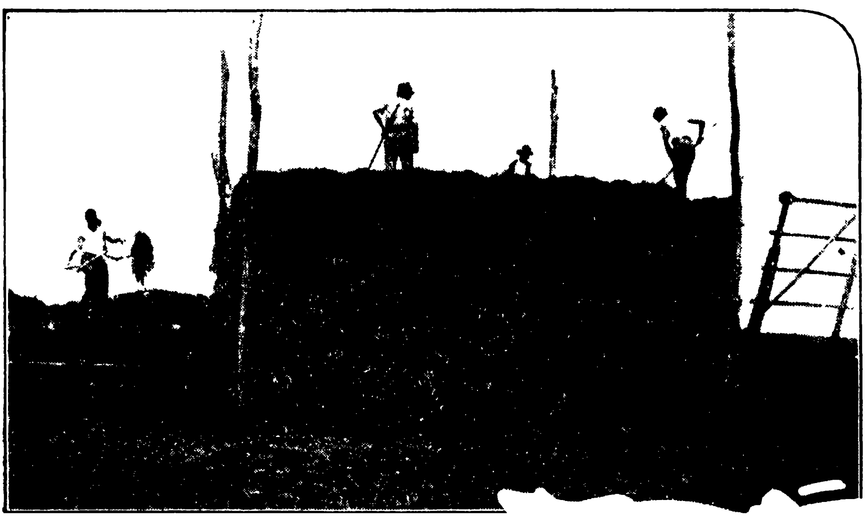


Illustration 10.—Stacks built of sheaved cereal on the haystack principle were not nearly as successful as the pole guided stack. The fodder was much darker, less succulent, and less nutritious.

he is in the happy position of being able to look back on the effort of the silage harvest with satisfaction. Whereas he employed labour to gather fodder which was available in plenty, it cost him only a fraction of what it would cost him had he to turn to, when prospects were bad, and buy fodder at shortage prices and at a time when he felt his money was most valuable. Surely the security, the insurance against a certainty and the obvious financial saving is a business proposition which every man on the land caring for his livestock must appreciate.

In order to give producers some idea of the costs, the estimated costs of the silage made at College last year are given as near as they can be assessed with any degree of accuracy under the special conditions prevailing. Actually the figures quoted below represent a cost which, if anything, errs on the side of being too high.

For labour at College students are practically relied upon, and the difficulty of estimating labour costs under the circumstances is obvious. Apart altogether from the difference in keenness and ability and devotion to the work in hand from the point of view of individual usefulness, an embarrassing number might be available some days followed by too few on other days. Taking a general view it is considered that for the purpose of valuing such labour it can be set down per individual as approximately half that of an experienced man, who would normally receive the basic wage for an eight hours day. On this basis, therefore, student labour has been charged at 5s. 3d. per day of eight hours, and this is considered to be a very high valuation, based as it is upon basic wage rates.

To arrive at the costs, the actual time, labour, and tonnage handled is reduced to unit equivalents per day. In this way direct comparisons can be made. The building of the loose stacks of volunteer growth, amounting to 240 tons, required 202 student-days and 46 men-days, which makes in all a labour cost of 6s. 5d. per ton. The ensiling of 300 tons in the overhead silos required 102 student-

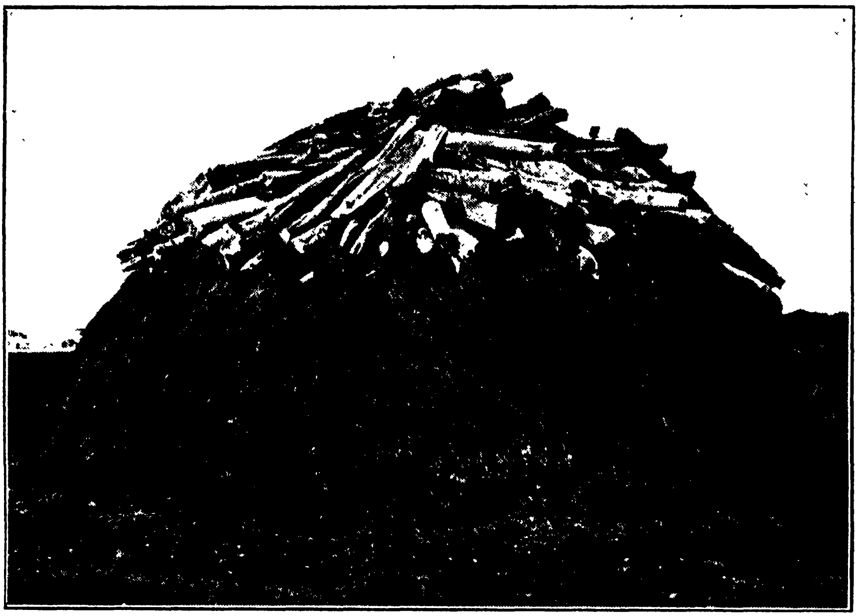


Illustration 11.—One of the Loose Stacks made from volunteer growth consisting chiefly of Burr Medic (or Burr Clover) and self-sown cereal. One hundred and thirty tons of fodder were ensiled in this stack.

days and 35 men-days, making a labour cost here of only 3s. per ton. This figure is low chiefly because of high yields obtained, and it is hardly fair to compare this cost with that of the loose stacks above, but in the building of sheaved stacks taken from the same cereal crops the costs are comparable. Here 58 student-days and 14½ men-days were required to handle and stack 190 tons, making a tonnage cost for labour of 2s. 5d.

Having assessed labour costs, the other items of expenditure remain for consideration. In this regard there is depreciation of plant and horse cost, which should be debited against such work. On the other hand rental or interest on capital is a matter which would accrue whether silage were made or not, and consequently for the purposes of these comparisons it is omitted.

As an offset to the low handling costs of cereal fodder ensiled in the overhead silos and in the sheaved stacks it must be remembered that crops were grown for the purpose and the costs of this production must be assessed. Whereas in the case of the loose fodder collected from self-sown areas no production costs need be considered, the only possible charge that could be made against such areas is loss of grazing during the period when the paddock was closed to livestock.

On the basis of the above the following table presents the approximate costs of the three types of silage made at the College last year.

Approximate Silage Cost at Roseworthy College, 1933, *based on Cost per ton and Labour at Basic Wage Rates.*

Type of Silage.	Production Cost.	Labour Cost.	Plant and Horse Cost.	Total Cost per Ton.
	s. d.	s. d.	s. d.	s. d.
Loose stacks	—	6 5	1 2	7 7
Overhead silos	2 8	3 0	2 6½	8 1½
Sheaved stacks	2 8	2 5	1 5	6 6

In the table, production costs include preparation of the soil, cost of seed, superphosphate, and seeding, together with expenses involved in harvesting.

The costs under the heading "plant and horse cost" include interest, depreciation, and renewals on implements for the time they were used. These costs also include an annual cost of the silo in the case of the overhead silos (which was estimated at 1s. 4d. per ton) and the annual cost of the framework for a pole-guided stack (estimated at 3d. per ton).

From the foregoing it is apparent that in years of plenty, when bounteous growth occurs, silage can be made without excessive and elaborate equipment, bother, or expense.

THE IMPORTANT PASTURE PLANTS OF SOUTH AUSTRALIA CONSIDERED AS TO THEIR IDENTIFICATION AND CHARACTERISTICS.

[By E. M. HUTTON, B.Ag.Sc., Field Officer.]

(Continued from page 60.)

4. RED CLOVER *(Trifolium pratense)*.

This is a highly palatable, hairy clover with upright stems. It develops a strong taproot which exploits the subsoil. Like other true clovers, the three small leaflet stalks are equal in size. Each of the large oval leaflets possesses a cream arch. (See Fig. 30.) The large stipules, which are longer than broad, are membranous with greenish-purple veins, and end in long hairy points. (See Fig. 31.) The small reddish-purple flowers are clustered into large dense heads. After flowering the petals become brown in colour. As it is essentially a spring and summer grower, it can be grown successfully in South Australia only under irrigation, or in our high rainfall districts, *e.g.*, lower South-East and parts of the Adelaide Hills, where the spring and summer are mild. In addition, this clover will only thrive on well-drained loams.

A. B.

Fig. 30—A: Giant colonial cow grass *(Trifolium pratense perenne)*. **B: Red or broad clover** *(Trifolium pratense)*.

[*From "G. and N. Catalogue,"* 1934.

In general, it can be regarded as a biennial only. Allowing the Red Clover stand to become mature and form seed has the effect of greatly reducing its life. The life of a Red Clover stands depends largely on the strain. The ordinary broad Red Clover is the shortest lived strain. Montgomery Red Clover, a more prostrate strain with a longer life than ordinary Red Clover, appears to have a definite place in pasture mixtures for the irrigated Murray Swamps. Giant Colonial Cow Grass or Perennial Red Clover (*Trifolium pratense perenne*), which possesses lance-shaped leaflets, is the most vigorous strain, and is also longer lived than

ordinary Red Clover. Giant Colonial Cow Grass and Ordinary Red Clover are best suited to cutting for green feed, ensilage, or hay because of their upright habit of growth.

In New Zealand, the bumble bee (*Bombus sp.*) plays an important part in the pollination of Red Clover.

5. ALSIKE CLOVER *(Trifolium hybridum).*

This clover is supposed to have originated from a cross between Red and White Clovers. It resembles Red Clover in appearance, but is practically hairless, has no cream arch on the leaf, and possesses stipules drawn out into a very long tapering point. (See Fig. 31.) The pale pink flowers are clustered into a round head. (See Fig. 32.)

It flourishes on heavy wet soils, and is also successful on acid soils, and those liable to waterlogging (cf. Strawberry Clover). It makes most of its growth during the winter and spring, and withstands frosts particularly well. Like Red Clover, it will not persist under hot, dry summer conditions. In South Australia

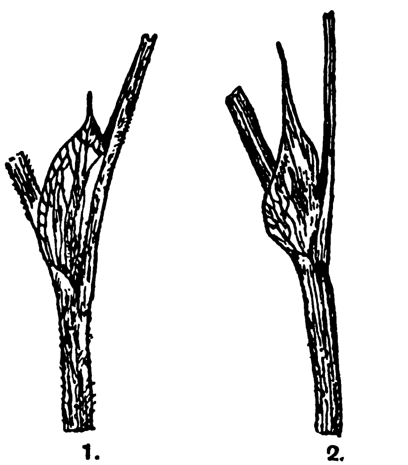


Fig. 31—Showing stipules of: 1, Red Clover (*Trifolium pratense*); 2, Alsike clover (*Trifolium hybridum*).

[*From "Agricultural Botany," by John Percival.*

Fig. 32—Alsike clover (*Trifolium hybridum*).

[*From "G. and N. Catalogue,"* 1934.

this clover could be of use probably on heavy ill-drained soils, which are not suitable for White and Red Clover. It appears to be very low in yield on the irrigated Murray Swamps.

6. BERSEEM CLOVER *(Trifolium alexandrinum).*

This is a vigorous annual clover possessing succulent stems and leaves, and having an upright habit of growth. The leaflets are characteristically lanceolate, and the yellowish flowers are clustered into a long head. It is an autumn, winter, and early spring grower. As it produces heavy crops of succulent herbage, and needs to be established before the cold of the winter, it can only be handled successfully under irrigation.

7. CLUSTERED CLOVER (*Trifolium glomeratum*).

This is a prostrate, hairless, annual clover, which can be confused with White Clover, because of the faint white arch in the centre of the leaflets. As pointed out before, the stipules end in sharp green points, and the leaflet margins are distinctly toothed. In White Clover the stipules are very different from those of Clustered Clover. The pink flowers are arranged in small, characteristic globular heads. It has often been called "Ball Clover" because of the shape of the seed head.

This highly palatable clover is found extensively throughout the settled areas. It is often badly attacked by lucerne flea. In late winter and spring, it produces a fair amount of useful feed. As far as South Australia is concerned, Clustered Clover appears to be a useful legume in the 16in.-20in rainfall country.

Fig. 33—Hop Clover (*Trifolium procumbens*).
[*From "Black's Flora of S.A."*

Fig. 34—Narrow-leaved Clover (*Trifolium angustifolium*).
[*From "Black's Flora of S.A."*

8. WOOLLY CLOVER (*Trifolium tomentosum*).

This annual clover is very similar in appearance to Clustered Clover, except that the flower heads become enlarged and woolly at maturity. It is very palatable, but not nearly as vigorous or abundant as Clustered Clover.

9. HOP CLOVER (*Trifolium procumbens*).

This hairless annual clover produces little leaf, is stemmy, and very low in productivity. The leaflets are pale green, and the slender upright stems become dark in colour. This is an example of a true clover, which has the central leaflet stalk longer than the other two. Thus at first sight it may be mistaken for a Medic. The stipules are turned back like the points of a stiff collar. The yellow papery flowers are clustered in a dense head. (See Fig. 33.) Although widely spread, this clover is of little use.

10. HARE'S-FOOT CLOVER (*Trifolium arvense*) and NARROW-LEAVED CLOVER (*Trifolium augustifolium*).

These hairy annual clovers are common in the settled districts. Stock will not eat them because of their unpalatability. Narrow-leaved clover has long pointed leaflets, and the long flower head has a tendency to become prickly at maturity.

(See Fig. 34.) Hare's foot Clover has long narrow leaflets with a notch at the tip. In addition, the base of the leaflet stalks are reddish-purple, and the flowers are clustered into small globular furry heads.

11. KNOTTED CLOVER (*Trifolium striatum*).

This is a hairy, prostrate, annual clover with diamond-shaped leaflets, the leaflets ending in a point. The leaflets possess a few dark fleckings. The stipules are hairy, and the long, green, hairy stipule tips have a tendency to turn back. It possesses small pink flowers, the seeds being formed in almost globular heads.

Knotted Clover occurs in the Adelaide Hills, and is eaten readily by stock.

(To be continued.)

THE BAKING QUALITIES OF AUSTRALIAN WHEATS.

No. 4.—The Quality of (a) Commercial Samples of South Australian Wheat and (b) Some Pure Lines of Ford.

[By A. R. Hickinbotham, B.Sc., Dip. Ed., A.A.C.I., Chemist, Agricultural College, Roseworthy.]

(a) Commercial Samples.

The Wholemeal Fermentation or Pelshenke Test (this *Journal*, June, 1934) is widely accepted as a reasonably reliable test for "quality" in wheat, and it has been used in an attempt to examine the importance of the various factors that might influence the quality of the grain grown in this State. In a general way, the quality of a sample is considered to be determined chiefly by hereditary factors, and by the climatic, and to a less extent the soil, conditions under which it is grown. From the data presented below, it appears that the hereditary factor is the only one of major importance in the wheatgrowing areas of South Australia.

Through the courtesy of the Director of Agriculture, over 300 samples of wheat of various varieties were obtained from the 1933-34 harvest, and these included grain from practically every important wheatgrowing district. Unfortunately for the purposes of comparison, nearly 40 varieties were represented, and of some of them only one or two specimens were received. Eight varieties accounted for 245 samples, and each of these varieties was represented by six or more samples (Table I.). Only four varieties were received from all of the seven Agricultural Districts and these four have been considered in compiling most of the following Tables, because an estimate of the potential quality of the wheat grown in different districts can be obtained from these data only if the districts are made to compete on the same basis, *i.e.*, with the same varieties; to include a high quality wheat grown in only one or two districts would invalidate the comparisons.

Table I., which gives the Test Number distribution for eight varieties, shows clearly the inferior quality of Gallipoli, which accounts for 30 of the 31 samples that gave a test of less than 30; the odd sample was labelled Ford, but is thought to be Gallipoli too. Gluyas and King's White are also of poor quality, while Nabawa, Ranee, and Sword are rather better. Ford is distinctly better than any of these, the results suggesting that it is a really good medium quality wheat. Florence, though extremely variable, is the best of the group. The highest testing lines of each variety have been planted, and their field performances will be compared amongst themselves, and with those of corresponding commercial seed. They will also be studied to determine whether they have inherited similar quality to that of their parents.

Most of the varieties exhibit a rather wide range in quality, for a sample giving a Test Number of 30 minutes is definitely weak, while one which gives a Test Number of 100 is of better than medium strength. A comparison of both the distributions and averages for districts, with those for the State (Tables I. and V.), suggests that the reason for this is probably not entirely a matter of differences in climate, but that differences in strain within the varieties are playing a part, and that some, at least, of these varieties may not be fixed for quality. Table II. shows the Test Number distributions of single plants of a few varieties, and also for a number of lines of Ford, each of which is the progeny of a single plant. These data, when considered alone or in comparison with that of Table I., support the contention that stronger lines may be obtainable by selection from some established commercial varieties.

Grain that is pinched has always been found to give a higher test than corresponding normal samples, the increase usually amounting to between 10 and 20 per cent. The extent to which this effect operates in these samples is illustrated in Table IX.

It is generally believed that an increase in available nitrogen in the soil improves quality within limits, but that the phosphate supply has little effect. The data given in Table VI. indicate that, if superphosphate does have any effect, it is slight. There is a noticeable tendency, particularly in the case of Nabawa, for quality to fall with increasing dressings, but the effects of low phosphate supply, low rainfall, and pinched grain on quality cannot be separated. For example, 36 of the 57 samples of Nabawa came from the four districts showing 30 per cent. or more of pinched grain (Table X.), and these are also the districts where, on the average, lower dressings of phosphate were used. Thus, it appears that pinched grain is tending to raise the apparent quality rather than that phosphate is lowering it. Table XI., which divides the samples according to both plumpness and amount of superphosphate used, indicates that plumper samples do tend to be associated with adequate supplies of phosphate, though, again, the effect is not marked. Possibly the very hard finishing conditions experienced throughout the State upset normal relationships in this respect.

It is sometimes asserted that high quality is associated with low rainfall, though it is more generally thought that finishing conditions are of greater importance. Hard finishing conditions were experienced throughout the State last year, so that the effect of this factor cannot be examined. Table VIII. shows the effect of differences in rainfall on the quality of these samples and suggests that, for the variations experienced in this State, quality is not appreciably affected by rainfall. Really wet conditions are not represented in the data; the bulk of the

"high" rainfall group were grown with less than 25in., and the highest fall recorded for any sample was 28.75in. In the case of Nabawa, a fall in quality appears to result under wetter conditions, but this is possibly due to other causes as in the similar case for phosphate with this variety.

The influence of the class of soil on quality is a matter upon which opinions vary. In Table VII. the soils upon which these samples were grown are classified into four broad types, those in which a limy subsoil or surface occurred being classed together as calcareous. In these samples the class of soil has had no effect on their quality.

In comparing the quality of the samples from each district (Table V.), no important differences are apparent, though there is a slight tendency for wheat from Upper Eyre's Peninsula to be a little better than average, while that from the Lower North falls slightly below the average. The Central district is helped by a high proportion of pinched grain, and the South-East is handicapped by a high percentage of plump samples. For this particular comparison, however, the districts are too wide, but the data are insufficient to permit of grouping into smaller units. There is, at least, a suggestion of an appreciable measure of uniformity in the quality of grain grown throughout the State.

In all these comparisons the possibility of certain strains of the varieties predominating in each district is an upsetting factor and, in an attempt to eliminate it, an effort is being made this year to secure similar samples grown from one strain of one variety by distributing the seed from the College, and to secure the general data in such a way as to permit of grouping it to represent districts on a natural and economic, rather than on an arbitrarily defined basis.

Finally, these samples were used to examine the extent to which certain characteristics of the grain, such as vitreousness and hardness, can be relied upon to indicate quality. It will be seen that very few genuinely hard or vitreous samples are included in the data, though, in these respects, they are, of course, typical of the commercial wheat grown in this State. The samples were first classified into three groups—vitreous, semi-vitreous, and mealy—and their Test Numbers are compared in Table XII., which gives the average, highest, and lowest test for each group of each of five varieties. It will be seen that there is evidence of but the slightest association of vitreousness and quality, and so many of the more vitreous samples show low tests and *vice versa*, that this property of the grain must be considered almost useless as an indication of their quality. They were then reclassified according to hardness (Table XIII.) which was estimated by the usual biting test, the classification being based on the combined opinions of two, and in some cases three, persons. It is evident that they show no association between hardness and quality. To some extent these results were surprising: it was thought that such tests did permit of broad distinctions being made; but these results, based as they are on such extensive and representative samples, must raise grave doubts as to the value of the tests, at least for average samples in which large differences do not occur.

(*b*) The Ford Lines.

From several of the Ford plants (Table II.) enough grain was available to permit of protein content determinations being made. Having the Test Number and protein content, the Specific Gluten Quality was calculated—by dividing the Test Number by the protein content—and, incidentally, the average weight of 20-grain samples was obtained. These results are given in Table III., from which it appears that the quantity of protein bears little, if any, relation to the Test Number, but that the Test Number and Specific Quality are closely related. Further, both these attributes seem to be definitely linked with small grain size.

Since these lines were grown side by side in a small plot, there is little possibility of normal relationships being upset by differences in environment or other conditions. The correlation coefficients between each pair of the factors were calculated, treating them as a group of 27 plants that might have been taken from any crop, and the results are tabulated in Table IV.

In these samples the protein content and Test Number show no correlation (+ .04), that is, an increase in protein content is as likely to be associated with a decrease as an increase in Test Number. Specific Quality shows only a slight (+ .20) tendency to increase as protein content increases, but there is a distinct tendency (— .36) for the percentage of protein to decrease as the size of the grain increases.

The Test Number shows a remarkably close correlation (+ .99) with the Specific Gluten Quality, though this result is misleading to some extent, because the Test Number is the dividend in the calculation of Specific Quality.* However, it may be concluded that nothing was gained by determining the protein content of these samples, and that the Test Number itself might have been taken as an indication of relative Specific Gluten Quality. When one considers the probable variations in protein content and Test Number in the population arising from most crosses in comparison with each other, it is obvious that the division of the Test Number by the percentage of protein cannot materially alter the order of the individuals. For material of this nature, then, the extra work involved in determining Specific Quality is not justified; it is sufficiently well indicated by the Test Number for practical purposes.

Considered in conjunction with the odds quoted below the Table, the correlation (— .72) between Test Number and grain weight is really high, and indicates a definite association of high "quality" with small grain. If the variations in protein content are eliminated the partial correlation coefficient becomes — .76, and if the material is treated as representing 11 lines of Ford (taking averages for the plants of a line) the coefficient is — .73, though the significance of this is less (about 100 : 1) owing to the smaller number of comparisons involved. These results would seem to indicate that, for the variety Ford, good quality will be found in small grained lines far more frequently than in large grained ones. All these lines have been planted, and an examination of the grain they produce will provide a check on this observation.

It cannot be inferred, of course, that small grain and quality will be associated in like degree in other varieties; indeed, the reverse might well be of just as frequent occurrence; but its probable value in selection appears to justify an inquiry as to whether a relationship of this nature can be shown to be at all common. No further pure line material—in which this possibility could be examined—was available here. On examining the commercial samples (Table I.) of Nabawa and Sword—the only varieties providing sufficient comparable material—comparing equal numbers of specimens of the same degree of plumpness from each district, a slight but distinct tendency in the same direction was found. For this comparison it was necessary to assume, of course, that the differences measured were due mainly to strains within the varieties. It therefore appears possible that a relationship between grain size and quality may exist, at least in certain varieties.

ACKNOWLEDGMENT.

I wish gratefully to acknowledge the interest and assistance of Mr. W. J. Spafford (Deputy Director) and the Agricultural Instructors in collecting the samples, an dolso of Mr. K. Woodroffe, R.D.A. (Cadet) who carried out many of the determinations.

*Cutler and Worzella (1933) have made the same observation. They repeatedly found an almost perfect positive correlation (+ .996) between "time" and "specific protein quality."

D

Table I.—*Wholemeal Fermentation Test Number Distribution for Eight Varieties.—Showing the number of samples of each variety received from each District their average Test Number, and their distribution in intervals of five units; also the corresponding figures for the State as a whole.* (*See note below.*)

District and Variety.	No.	Average.	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	90 94	95 99	100 104	105 109	110 114
Lower North—																					
Nabawa	14	48	—	—	1	3	2	2	2	2	1	1	—	—	—	—	—	—	—	—	—
Gallipoli	13	27	8	3	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—
Ranee	14	43	—	—	—	2	5	3	2	—	2	—	—	—	—	—	—	—	—	—	—
Sword	22	46	—	—	2	3	6	5	1	2	2	1	—	—	—	—	—	—	—	—	—
Ford	5	74	—	—	—	—	—	—	—	—	1	—	2	—	1	—	1	—	—	—	—
Gluyas	2	37	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
King's White	3	43	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Florence	1	57	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Totals	74	—	8	3	5	9	14	10	6	5	6	3	2	—	1	—	1	—	—	—	—
Central—																					
Nabawa	9	56	—	—	—	—	3	1	2	—	1	—	1	—	—	—	1	—	—	—	—
Gallipoli	3	34	—	2	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranee	6	55	—	—	—	—	1	—	2	2	—	1	—	—	—	—	—	—	—	—	—
Sword	9	47	—	—	—	—	5	1	3	—	—	—	—	—	—	—	—	—	—	—	—
Ford	3	69	—	—	—	—	—	—	1	—	—	1	—	—	—	1	—	—	—	—	—
Gluyas	2	37	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
King's White	1	44	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Florence	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Totals	34	—	—	2	1	—	11	3	8	2	1	2	1	—	—	1	1	—	—	—	1
South-East—																					
Nabawa	2	44	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Gallipoli	13	33	2	6	2	—	1	1	—	—	1	—	—	—	—	—	—	—	—	—	—
Ranee	6	56	—	—	—	1	—	—	4	—	—	—	—	—	—	—	1	—	—	—	—
Sword	1	59	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Ford	4	64	—	1	—	—	—	—	—	1	—	—	1	—	—	—	—	1	—	—	—
Totals	26	—	2	7	2	1	2	2	4	2	1	—	1	—	—	—	1	1	—	—	—

Note.—The table shows that, from the Lower North, there was one Nabawa sample which tested between 30 and 34 minutes, three tested between 35 and 39, two between 40 and 44, and so on.

TABLE I.—*Wholemeal Fermentation Test Number Distribution for Eight Varieties*—continued.

District and Variety.	No.	Average.	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	90 94	95 99	100 104	105 109	110 114
Mid-North—																					
Nabawa	5	53	—	—	—	—	1	—	1	3	—	—	—	—	—	—	—	—	—	—	—
Gallipoli	7	30	—	3	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranee	7	58	—	—	—	1	1	1	—	1	2	—	—	—	—	—	—	1	—	—	—
Sword	1	50	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Gluyas	1	69	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—
King's White	2	42	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	23	—	—	3	2	4	2	2	2	4	2	1	—	—	—	—	—	1	—	—	—
Murray Mallee—																					
Nabawa	7	53	—	—	—	1	1	—	2	1	1	1	—	—	—	—	—	—	—	—	—
Gallipoli	6	30	1	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranee	4	43	—	—	1	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—
Sword	6	47	—	—	—	1	2	—	2	1	—	—	—	—	—	—	—	—	—	—	—
Ford	4	86	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	1	—	1	—
Gluyas	5	43	—	—	1	1	—	2	1	—	—	—	—	—	—	—	—	—	—	—	—
Totals	32	—	1	2	4	4	3	5	5	2	2	1	1	—	—	—	—	1	—	1	—
Lower Eyre's Peninsula—																					
Nabawa	10	49	—	—	1	—	3	2	1	—	3	—	—	—	—	—	—	—	—	—	—
Gallipoli	5	29	1	1	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranee	4	47	—	—	—	—	2	—	1	1	—	—	—	—	—	—	—	—	—	—	—
Sword	3	47	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—
Ford	5	65	—	—	—	—	—	1	1	—	—	1	1	—	—	—	1	—	—	—	—
Florence	3	79	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	1	—
Totals	30	—	1	1	3	2	5	4	3	3	3	1	1	1	—	—	1	—	—	1	—

TABLE I.—*Wholemeal Fermentation Test Number Distribution for Eight Varieties*—continued.

District and Variety.	No.	Average.	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	90 94	95 99	100 104	105 109	110 114
Upper Eyre's Peninsula—																					
Nabawa	10	55	—	—	—	—	2	1	4	1	—	1	—	—	—	1	—	—	—	—	—
Gallipoli	3	29	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ranee	3	65	—	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	—	—	—
Sword	1	51	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Ford	2	91	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—
Gluyas	5	36	—	—	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
King's White	1	35	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Florence	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Totals	26	—	—	1	4	3	3	1	5	2	1	3	—	—	1	1	—	1	—	—	—
State—																					
Nabawa	57	51	—	—	2	4	13	7	12	7	6	3	1	—	—	1	1	—	—	—	—
Gallipoli	50	30	12	18	11	4	1	2	—	—	1	1	—	—	—	—	—	—	—	—	—
Ranee	44	52	—	—	1	4	9	7	9	4	5	3	—	—	—	—	1	1	—	—	—
Sword	43	47	—	—	2	5	13	7	8	5	2	1	—	—	—	—	—	—	—	—	—
Ford	23	73	—	1	—	—	—	1	2	1	2	2	5	—	2	1	2	3	—	1	—
Gluyas	15	41	—	—	4	5	2	2	1	—	—	1	—	—	—	—	—	—	—	—	—
King's White	7	42	—	—	1	2	2	1	1	—	—	—	—	—	—	—	—	—	—	—	—
Florence	6	77	—	—	—	—	—	—	—	3	—	—	—	1	—	—	—	—	—	1	1
Totals	245	—	12	19	21	24	40	27	33	20	16	11	6	1	2	2	4	4	—	2	1

TABLE II.—*Wholemeal Fermentation Test Number Distribution for the grain of individual plants of several varieties ; also for strains, each the progeny of a single plant, of the variety Ford, showing the number of plants tested, their average test, and the distribution of the individuals.*

Variety or Pure Line.	No.	Avge.	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	90 94	95 99	100 104	105 109	110 114	115 119	120 124	125 129	130 134	135 139	140 144	145 149	150 154
Varieties—																													
R.A.C. Gluyas.	12	29	1	6	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Baringa	12	35	—	—	7	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Gullen........	12	37	—	1	3	3	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Florence	12	74	—	—	—	—	—	—	—	2	2	2	2	1	1	—	—	1	—	—	—	—	—	1	—	—	—	—	—
Nabawa	54	46	—	1	4	9	10	15	6	5	1	1	—	—	—	—	1	—	—	—	—	—	—	—	1	—	—	—	—
Sword	49	46	—	—	1	11	13	7	10	4	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ford	49	60	—	—	—	—	1	4	12	7	10	4	4	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ford Lines—																													
Line 2	9	55	—	—	—	—	1	1	2	2	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Line 4	10	100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	2	2	1	—	—	—	—	—	—	—	—
Line 6	7	78	—	—	—	—	—	—	—	—	—	—	—	—	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Line 10	10	62	—	—	1	—	—	—	—	1	4	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Line 14	10	71	—	—	—	—	—	—	—	—	—	5	3	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Line 16	10	79	—	—	—	—	—	—	—	—	—	—	3	4	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—
Line 21	9	122	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	—	1	1	—	—	—	1	1	1	1
Line 23	7	102	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2	1	—	1	—	1	—	1	—	—	—	—	—
Line 24	10	115	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	4	—	—	—	1	—	—	—
Line 26	10	96	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	3	1	—	—	—	1	—	—	—	—	—	—
Line 31	10	58	—	—	—	—	—	—	—	7	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Line 33	7	67	—	—	—	—	—	—	—	—	2	3	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Line 35	9	90	—	—	—	—	—	—	—	—	—	—	—	—	1	3	2	3	—	—	—	—	—	—	—	—	—	—	—
Line 37	10	81	—	—	—	—	—	—	—	—	—	—	2	1	3	3	—	1	—	—	—	—	—	—	—	—	—	—	—

NOTE.—The Ford lines were grown in hand plots ; the results obtained when testing grain from these are always found to be 20 to 30 per cent. higher than for similar grain grown under field conditions.

TABLE III.—*Wholemeal Fermentation Test Number, Protein content and Specific Protein quality (Test No. ÷ Protein content) of individual plants from pure lines of Ford wheat (selected from the lines listed in Table II.); also Grain weights.*

Line.	Range in Minutes.	Average Test No. of Line.	Plant No.	Test No.	Protein (Nx5·7)	Specific Quality.	Average Weight in Grams of 20 Grains.
4	90–112	100	6	112	15·74	7·12	·85
10	34–72	62	3	72	14·57	4·94	·86
			6	59	15·71	3·76	·95
			10	63	15·68	4·02	·90
16	72–93	79	1	87	14·55	5·98	·85
			2	77	15·27	5·04	·91
23	88–128	102	6	128	16·79	7·72	·64
			10	88	15·12	5·82	·76
24	106–138	115	2	111	16·01	6·93	·66
			6	138	16·91	8·16	·64
			8	106	16·89	6·28	·65
26	86–124	96	5	86	16·52	5·21	·68
			6	124	15·73	7·88	·63
			8	96	15·99	6·00	·72
31	55–63	58	2	60	15·82	3·79	·90
			3	60	15·48	3·88	·84
			8	55	16·03	3·43	·78
33	64–71	67	2	64	16·59	3·86	·83
			9	71	16·39	4·33	·83
35	83–98	90	6	83	15·38	5·40	·79
			9	98	16·28	6·02	·80
37	70–98	81	2	86	16·16	5·32	·73
			8	71	15·28	4·65	·82
			10	80	15·55	5·14	·85
41	79–89	85	2	84	16·23	5·18	·91
			3	85	16·96	5·01	·91
			8	79	16·15	4·89	·91

NOTE.—Protein (N x 5·7 of dry matter) was determined as the mean of two 20 grain samples and the significant difference between any pair (odds 20 : 1) was found to be, by an independent determination, approximately 0·40 per cent.

TABLE IV.—*Correlation Table based on the Data of Table III.*

	Test Number.	Protein Content.	Specific Quality.	Grain Weight.
Test Number	—	+0·04	+0·99	−0·72
Protein content	+0·04	—	+0·20	−0·36
Specific quality	+0·99	+0·20	—	−0·70
Grain Weight	−0·72	−0·36	−0·70	—

NOTE.—For the number of comparisons involved the odds are 10 : 1 against a correlation coefficient of .323 being exceeded by chance, and 100 : 1 against .487 being exceeded by chance.

TABLE V.—*Comparison of Districts for Quality. Showing the average test for each District and the State for each of the four varieties that were represented in every District; also the average test of these four varieties, which indicates roughly the relative quality of wheat grown in each District.*

District.	Nabawa.	Gallipoli.	Ranee.	Sword.	Average of 4 varieties.
Lower North	48	27	43	46	41·0
Central	56	34	55	47	48·0
South-East	44	33	56	59	48·0
Middle North	53	30	58	50	47·8
Murray Mallee	53	30	43	47	43·3
Lower Eyre's Peninsula	49	29	47	47	43·0
Upper Eyre's Peninsula	55	29	65	51	50·0
State	51	30	52	47	45·0

TABLE VI.—*The Effect of Various Dressings of Superphosphate on Quality. Based on the four varieties represented in every district, showing the percentage of samples of each variety receiving each dressing and corresponding average Test Number.*

Superphosphate.	Nabawa.		Gallipoli.		Ranee.		Sword.	
Lbs. Per Acre.	%	Test.	%	Test.	%	Test.	%	Test.
0-55	15	58	11	30	12·5	62	9	45
56-85	31	52	31	29	31	58	14	50
86-105	37	52	33	35	44	46	41	47
Over 105	17	48	25	28	12·5	54	36	49
All rates	100	51	100	30	100	52	100	47

TABLE VII.—*The effect of Class of Soil on Quality. Based on the four varieties represented in every district, showing the percentage of samples grown on each kind of soil and the corresponding average Test Number.*

Class of Soil.	Nabawa.		Gallipoli.		Ranee.		Sword.	
	%	Test.	%	Test.	%	Test.	%	Test.
Light	31	51	19	29	27	52	38	44
Medium	29	53	28	32	33	55	19	51
Heavy	14	49	22	32	20	54	14	52
Calcareous	26	54	31	29	20	48	29	48
All Kinds	100	51	100	30	100	52	100	47

TABLE VIII.—*The effect of Rainfall on Quality. Based on the four representative varieties, showing the percentage of samples of each variety grown within certain limits of rainfall and the corresponding average Test Numbers.*

Rainfall Groups.	Nabawa.		Gallipoli.		Ranee.		Sword.	
	%	Test.	%	Test.	%	Test.	%	Test.
Under 12″	32	60	25	30	40	54	36	47
12″-16″	48	51	25	31	27	51	45	47
Over 16″	20	44	50	31	33	53	19	53
All Groups	100	51	100	30	100	52	100	47

TABLE IX.—*The quality of Plump compared with Pinched grain. Based on the four representative varieties, showing the percentages of plump, average, and pinched grain for each variety and the corresponding average Test Numbers.*

Sample.	Nabawa.		Gallipoli.		Ranee.		Sword.	
	%	Test.	%	Test.	%	Test.	%	Test.
Plump	38	45	73	30	23	41	36	44
Average	31	49	17	31	51	51	39	44
Pinched	31	56	10	30	26	56	25	52
All Samples	100	51	100	30	100	52	100	47

TABLE X.—*Percentages of Plump, Average, and Pinched grain from each District. Based on all samples received.*

District.	Plump.	Average.	Pinched.
Lower North	53	29	18
Central	33	37	40
South-East	67	23	10
Middle North	48	36	16
Murray Mallee	16	34	50
Lower Eyre's Peninsula	43	27	30
Upper Eyre's Peninsula	22	45	33
State	42	32	26

TABLE XI.—*The effect of various Rates of Application of Superphosphate on the Filling of the Grain. Showing, for the samples of the four representative varieties for which data was available, the percentages of plump, average, and pinched grain obtained from various dressings.*

Sample.	Superphosphate Dressing in Lbs. per acre.				Totals.
	0-55	56-85	86-105	Over 105.	
Plump	2	10	19	8	39
Average	6	9	13	5	33
Pinched	5	8	9	6	28
Totals	13	27	41	19	100

TABLE XII.—*The Relationship of Vitreousness of Grain and Quality. Based on five representative varieties, showing percentages of vitreous, semi-vitreous, and mealy grain for each variety and corresponding average Test Numbers; also the highest and lowest Test Number obtained in each group.*

Variety.	Classification of Grain.					
	Vitreous.		Semi-vitreous.		Mealy.	
	%	Test.	%	Test.	%	Test.
Nabawa—Average	7	52	55	53	38	50
Highest		63		92		74
Lowest		40		30		34
Gallipoli—Average	4	31	31	32	65	29
Highest		32		68		62
Lowest		30		22		20
Ranee—Average	2	47	45	55	53	48
Highest		—		97		68
Lowest		—		37		30
Sword—Average	—	—	33	51	67	44
Highest		—		60		67
Lowest		—		40		33
Ford—Average	5	91	38	85	57	79
Highest		—		99		109
Lowest		—		69		50

TABLE XIII.—*The Relationship of Hardness of Grain, estimated by a biting test, to Quality.*

Variety.	Classification of Grain.					
	Hard.		Medium.		Soft.	
	%	Test.	%	Test.	%	Test.
Nabawa—Average	4	41	60	50	36	56
Highest		42		92		85
Lowest		40		30		39
Gallipoli—Average	—	—	64	29	36	31
Highest		—		68		62
Lowest		—		21		20
Sword—Average	—	—	57	46	43	48
Highest		—		60		67
Lowest		—		34		33
Ranee—Average	—	—	61	51	39	51
Highest		—		90		97
Lowest		—		30		36
Ford—Average	—	—	52	73	48	74
Highest		—		99		109
Lowest		—		48		50

AGRICULTURAL EXPERIMENTS AT INMAN VALLEY.

EXPERIMENTS CONDUCTED ON THE PROPERTY OF Mr. A. M. FULLER.

[By R. C. SCOTT, Supervisor of Experimental Work.]

The experiments at Inman Valley consist of a series of tests with pasture varieties and variety mixtures. They were commenced in 1928 at the request of the local Agricultural Bureau and placed on the property of Mr. A. M. Fuller, who is keenly interested in such work.

Mr. Fuller's land is situated on the eastern side of the Inman Valley township, and this township lies midway between Victor Harbour and Yankalilla, or approximately 40 miles due south from Adelaide.

The plots themselves are placed on relatively flat land adjoining and on the northern side of the Inman River. It is on such land that the orange groves of this locality are generally to be found.

Close to the river the soil consists of somewhat silty material which drains rapidly and does not possess any appreciable natural fertility, but the hollows or the area adjacent to the hills is much heavier in nature, darker in colour, and has considerably higher fertility.

Originally the better quality land carried large redgum timber, whilst stringybark predominated on the poorer more sandy soils.

Rainfall at Inman Valley, 1928-1933.

	1928.	1929.	1930.	1931.	1932.	1933.	Mean, 1928-33.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
January	1·49	0·71	0·00	0·74	0·00	1·61	0·76
February	1·73	0·00	1·23	0·34	1·92	0·17	0·90
March	2·42	0·94	0·21	1·62	2·08	1·27	1·42
April	1·38	1·77	2·36	1·68	4·34	1·35	2·15
May	2·29	2·22	0·72	5·38	1·73	5·03	2·90
June	6·36	6·28	2·02	8·11	5·77	2·34	5·15
July	5·12	3·74	5·07	6·51	6·59	3·52	5·09
August	0·80	4·03	5·53	3·16	4·44	3·90	3·64
September	2·15	4·44	3·29	4·29	2·91	4·33	3·57
October	4·21	2·06	2·84	1·10	2·59	1·37	2·36
November	1·04	0·96	1·12	1·05	0·78	1·05	1.00
December	0·54	1·36	0·71	0·31	0·56	1·33	0·80
Total	29·53	28·51	25·10	34·29	33·71	27·27	29·74

There is no official rainfall-recording station at Inman Valley, but since the commencement of the experiment a gauge has been placed on the farm, and the amounts registered are shown in the preceding table.

It will be noticed that the mean annual fall for the six-year period approaches 30in., and thus it would appear that the district is fairly favourably situated for the development of pasture plants. However, examination of the monthly falls shows that for four months of the year, namely, November to March, the total precipitation only amounts to about 3½in., and, as this corresponds with the period of maximum temperatures, it is difficult for perennial plants to carry through unless they possess particularly deep-rooting habits and drought-resisting properties.

The necessity for these requirements of perennial plants is further illustrated by the fact that in three years out of the six under review not a single point has been registered for the whole of a calendar month, but, in addition to this, the daily rainfall readings show that at times these rainless periods have extended from seven to eight weeks. Consequently, whilst the total rainfall is satisfactory, the distribution is very irregular and drought conditions more or less exist during the summer months of the year. On the other hand, however, the locality is noted for its relatively cool summer weather, with the result that this shortage of rain is not so severe on plants as would be the case should both dry conditions and extreme temperatures regularly prevail. Another characteristic of the Inman Valley rainfall is the amount registered during the winter months and the continued dampness of the surface soil, thus creating favourable conditions for the rapid hatching and free development of the lucerne flea. In the majority of seasons the flea attack is very serious on the lower lying land, and this pest practically wipes out the less vigorous and smoother leaved legumes, whilst retarding the development of the more resistant type, such as Subterranean Clover.

Plot 1.

The area of this plot is approximately 4½ acres and the character of the soil varies from the heavy black coloured type to that of the lighter more sandy nature, which adjoins the river.

Seeding took place in May, 1928, but owing to unfavourable climatic conditions a good stand was not secured in that year, and a further planting was made in the following season. The varieties comprising the mixture were:—Perennial Rye Grass, Italian Rye Grass, Wimmera Rye Grass, White Clover, Alsike Clover.

The idea behind this mixture was that the Italian Rye Grass would provide the bulk of pasture in the first two seasons, during which time the perennials should become firmly established. Being a biennial it would then die out and allow for the expansion of the other plants seeded. In the event of summer conditions proving too severe for Perennial Rye Grass, the Wimmera would be available to replace it, whilst it was thought that the clovers would prove suitable for local conditions.

However, whilst fair grazing was secured in the earlier years, amounting to almost three sheep per acre in 1930, the plot proved a failure from the point of view of establishing a good pasture mixture, and was eventually ploughed up in 1933.

The lucerne flea were far too severe for the clovers, which made relatively weak growth, and after struggling for two or three seasons, with the combination of dry weather in the summer and lucerne flea in the winter, both varieties eventually disappeared.

The Italian Rye Grass answered the purpose for which it was sown, but the Perennial was not the truly persistent strain and died out completely in its fourth year. The Wimmera was patchy, and reseeding was affected in 1931 by a disastrous fire which swept through the district, including this plot, in January of that year. However, whilst the plot proved a failure, all the varieties included in the mixture should not be condemned on that account, and their relative value for the district will be discussed later on under the section dealing with Varieties.

Plot 2.

Quite a different pasture mixture is seeded in this plot, which is 7.18 acres in area. As was the case with the planting of Plot 1, seeding extended over two seasons, namely, 1928 and 1929, whilst Subterranean Clover was added in 1932. The following varieties were included:—*Phalaris tuberosa*, Cocksfoot, Timothy,

Meadow Fescue, Sheeps Burnet, Chicory, White Clover, Red Clover, Strawberry Clover, Subterranean Clover.

At the present time the fodder available does not comprise a general mixture of all the pasture varieties mentioned above. The Timothy and Meadow Fescue failed entirely. They both germinated fairly well, but rapidly died out.

Scattered plants of Sheeps Burnet, Chicory, Red Clover, and White Clover are to be found, but, generally speaking, do not contribute a great body of feed.

The Strawberry Clover has done fairly well, more especially on the damper land at the foot of the hills and provides palatable grazing.

Because of the relative failure of the clovers, it was decided to add Subterranean Clover in 1932, since it was known that this variety would do so well. Accordingly, 6lbs. of seed per acre was drilled in at the end of April of that year, but owing to the dry ground and other growth it was difficult to effect a good cover, with the result that much was lost through being consumed by birds, chiefly parrots. However, that which escaped has seeded itself down, and the Subterranean Clover stand is now steadily thickening itself up.

The outstanding pasture has been *Phalaris tuberosa*, which made strong growth right from the first season, especially on the areas previously covered by large trees or where timber had been burned. Each year the crowns have increased in size, with a corresponding increase in the quantity of fodder, and this variety now contributes really good grazing.

The Cocksfoot was also satisfactory for a time, but it was found that particularly in the lighter class of land many plants were pulled up by stock when grazing upon them, with the result that the stand has now been thinned out very considerably.

The carrying capacity of this pasture has been recorded, and, although sheep, cows, and horses have been depastured, the grazing has been calculated on a sheep per acre basis, allowing one horse as being equivalent to 10 sheep and one cow or light horse to eight sheep in amount of fodder consumed. The grazing year has been taken from April 1st to March 31st, and the results obtained are shown below:—

1928-29	1.12	sheep	per acre	per annum
1929-30	2.14	"	"	"
1930-31	2.52	"	"	"
1931-32	2.79	"	"	"
1932-33	2.91	"	"	"
Mean for five years	2.30			

The above figures show a steady improvement in quantity of pasture obtained, and it is reasonable to assume that such improvement will be continued as the Subterranean Clover becomes better established and the *Phalaris tuberosa* crowns expand over a wider area.

There is little doubt that ultimately a really good pasture will be secured, but of a much different nature to that aimed at when the original seeding was planned.

From the experience gained with this plot, it would appear advisable to confine the mixture to two varieties, namely, *Phalaris tuberosa* and Subterranean Clover.

The former should be firmly established before any attempt is made to provide a dense mat of the latter, and in this connection the land should be thoroughly prepared and 4lbs. to 5lbs. of *Phalaris tuberosa* seed planted per acre, together with a sprinkling of Subterranean Clover.

On the other hand, the former could be sown alone, and a heavier seeding of the latter made in the second year, thus avoiding the danger of crowding out the Phalaris plants which are very delicate in the first few weeks after germination.

PLOT 3.

In 1930 it was decided to make a comparison between the two perennial grasses which appeared best suited to the district, namely, Perennial Rye Grass and *Phalaris tuberosa*. Accordingly, a small field, approximately 1½ acres in area, was sown with these varieties in 1930.

In earlier years the land selected had carried fruit trees, chiefly oranges and apples, but owing to lack of attention many of these had failed, and in 1928 and 1929 potatoes, melons, and pumpkins were planted.

In May of 1930 the soil was well prepared and one-half of the field sown with *Phalaris tuberosa* at the rate of 8lbs. of seed per acre, and the remaining half with 30lbs. of Perennial Rye Grass seed per acre.

At the time, Certified Rye Grass seed was difficult to obtain, and eventually uncertified New Zealand seed was purchased. Consequently there was no guarantee that such seed had been harvested from an old pasture stand and possessed truly perennial habits.

In the first year an excellent stand was secured, resulting in the production of a bulk of pasture. Again in the second year really good grazing was obtained, but in 1932, that is to say, in the third season after planting, it thinned out very appreciably, and at the present time only scattered plants are to be found.

This plot has provided an excellent illustration of the importance of good seed. That planted here was of the sort-lived type, growing strongly at first, but dying out in the course of a few years.

On the other hand, seed of the best type would have yielded leafy plants which, with normal seasonal conditions, would have survived for a considerable period of time.

However, it does not follow that seed possessing these desirable characters can only be secured through some certification scheme, since in the Inman Valley district and a number of other places in South Australia there are limited areas which were planted with good type seed many years ago. The plants present to-day are of good pasture quality, are truly perennial, and well suited to the soil and climatic conditions of the district. Therefore, seed secured from such crops would be very valuable for planting under similar conditions. Failing this, however, certified seed should be purchased, as it is false economy to purchase cheap lines, which eventually may not meet requirements.

Notwithstanding the results obtained from this plot, there are good stands of rye grass in the locality, and there is little doubt that, provided that seed of good strain is planted, Perennial Rye grass is well suited to the damper areas of the Inman Valley district.

The *Phalaris tuberosa* was rather slow growing at first, but contrary to the experience with the Perennial Rye Grass steadily improved with age, and now provides really good pasture.

However, the plants are somewhat crowded, and the seeding of 8lbs. per acre could, with advantage, be reduced to approximately half that quantity. This would allow for full development of the crowns of the plants and quicker recovery after grazing than is the case when they are crowded too closely together.

The grazing returns taken over the full area, including both plots, have been kept, and have been maintained, at a fairly even figure, being 4.68 sheep per acre in 1930, 4.33 in 1931, and 5.01 in 1932. This regularity is due to the fact that, whilst Phalaris has improved, the Rye Grass has slipped back in the amount of fodder produced. Owing to the strain of Rye Grass seeded, the results secured from this test do not permit a comparison of the varieties to be made. However, both are capable of satisfactory returns under special circumstances, but it would appear that *Phalaris tuberosa* has the ability to thrive and yield good pasture when seeded in poorer quality soil and drier conditions than would be suitable for Perennial Rye Grass.

Variety Plots.

A number of varieties were tested, each being sown as a pure stand in plots about one-sixth of an acre in area. Relatively few showed to special advantage, and the pastures of importance in this district appear to be limited in number.

There is little doubt that Subterranean is the best variety of clover, although Clustered has also made fair growth. The only other worthy of mention is Strawberry Clover, which has spread along the edge of a watercourse and provided palatable grazing.

In connection with the clovers, it should be recalled that lucerne flea render very difficult the establishing of any weak-growing legume.

Amongst the grasses, *Phalaris tuberosa* has yielded most fodder.

Wimmera Rye Grass also has value for the lighter and drier soils, whilst Perennial Rye Grass requires wetter and richer soil conditions.

A plot of Wallaby Grass (*Danthonia pilosa*) was included in the trials, and, although this variety made little headway in the first season, it has since done well and is worthy of inclusion in a pasture mixture.

Cocksfoot is another fodder which promised fairly well, but did not survive as well as anticipated.

Acknowledgment.

It is desired to place on record our appreciation of the co-operation of Mr. A. M. Fuller in these experiments and the manner in which he has kept the grazing and observation records required. The local Agricultural Bureau has also organised visits of inspection, and to all concerned we extend the thanks of the Department.

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JULY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during July.	Per Cow during July.	Per Herd during July.	Per Cow during July.	
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H	7	5·10	2,154½	307·78	113·02	16·14	5·25
7/L	31	19·61	11,081½	357·47	496·20	16·01	4·48
7/P	25	20·58	14,107	584·28	711·06	28·44	5·04
7/AA	24·16	16·87	8,198	339·32	404·06	16·72	4·93
7/TT	15	11·90	9,188½	612·57	439·81	29·32	4·79
7/UU	25·87	21·65	13,743	531·23	614·27	23·74	4·47
7/XX	21·48	15·61	10,800½	502·81	561·76	26·15	5·20
7/BBB	52	39·52	24,972½	480·24	1,169·71	22·49	4·68
7/CCC	21	14·84	7,051½	335·78	316·39	15·07	4·49
7/DDD	13	9·13	5,548	426·77	266·50	20·50	4·80
7/EEE	10·84	10	6,308½	581·95	331·44	30·58	5·25
7/GGG	17	8	4,014½	236·14	203·20	11·95	5·06
7/HHH	12·87	12·68	6,984	542·65	264·90	20·58	3·79
7/III	15	4	4,231½	282·10	171·30	11·42	4·05
7/JJJ	10	9·23	5,080	508·00	247·35	24·74	4·87
7/KKK	30·81	17·81	7,951	258·06	429·53	13·94	5·40
7/LLL	20·74	14·42	9,391	452·79	486·83	23·47	5·18
7/MMM	13	8	3,487½	268·26	183·31	14·10	5·26
Means	20·32	14·39	8,571·83	421·83	411·70	20·26	4·80

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR JULY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during July.	Per Cow during July.	Per Cow December to July.	Per Herd during July.	Per Cow during July.	Per Cow December to July.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	19	16·06	11,130	584·12	3,326·78	501·41	26·29	163·54	4·50
6/C	22	12·77	9,347½	424·88	3,449·69	387·71	17·62	147·60	4·15
6/H	24	18·29	12 188½	507·85	3,087·54	545·84	22·74	152·31	4·48
6/Y	15	7·23	2,328½	155·23	2,971·64	102·84	6·86	132·54	4·38
6/II	21·87	17·06	8,091	369·95	5,111·42	365·14	16·70	220·44	4·51
6/LL	26	19·10	9,907½	381·06	3,828·49	348·17	13·39	145·16	3·51
6/OO	19·55	13·26	8,710	445·52	4,670·46	370·82	18·97	215·89	4·26
C/PP	15	10·58	6,009	400·60	4,003·00	321·95	21·46	204·17	5·36
6/RR	27	16	9,671	358·18	5,414·74	430·83	15·96	228·18	4·45
6/TT	20	17·13	10,037	501·85	5,205·95	448·76	22·44	232·12	4·47
6/XX	24·61	16·55	10,891	442·54	4,453·49	447·36	18·18	194·68	4·11
6/ZZ	27·18	21·13	9,642½	367·29	4,342·28	448·14	17·08	207·16	4·65
6/BBB	23·23	15	8,933	392·88	4,514·36	403·19	17·72	202·41	4·51
6/CCC	21	14·58	8,923½	424·93	3,820·70	357·04	17·00	165·62	4·00
6/DDD	22·32	17·61	10,965	491·26	4,856·15	454·09	20·34	202·84	4·14
6/EEE	27·97	17·19	15,265	545·76	5,342·73	604·19	21·60	220·25	3·96
6/FFF	23·39	19·87	11,070	473·28	5,247·49	448·96	19·19	221·24	4·06
6/GGG	25·26	19·16	12,386½	490·36	5,529·86	458·91	18·17	208·62	3·70
6/III	25	21·87	14,330½	573·22	5,678·26	558·26	22·33	236·69	3·90
6/JJJ	25	17·90	10,584½	423·38	4,248·97	504·57	20·18	203·74	4·77
6/KKK	37·84	28·26	19,718½	521·10	5,501·65	766·93	20·27	216·77	3·89
					3,914·15	442·04	19·46	182·73	4·29
6/LLL	22·87	16·23	10,096½	443·70	May-July			May-July	
6/MMM	9·81	8·13	8,097½	825·42	2,229·98	322·41	32·86	83·02	3·98
Means	22·82	16·56	10,361·91	454·08	4,562·91	436·50	19·18	197·97	4·21

NARRUNG HERD TESTING ASSOCIATION.

RESULT OF BUTTERFAT TESTS FOR JULY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during July.	Milk. Per Cow during July.	Milk. Per Cow October to July.	Butterfat. Per Herd during July.	Butterfat. Per Cow during July.	Butterfat. Per Cow October to July.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	36	29·19	14,389	399·69	4,511·90	779·66	21·66	230·13	5·42
5/D ..	34·90	25·45	14,056½	402·76	4,041·79	752·72	21·57	217·90	5·35
5/E ..	38·97	28·90	17,483½	449·91	4,006·94	911·02	23·44	211·58	5·21
5/P ..	36	30·48	24,428½	678·57	6,140·90	1,170·38	32·51	295·99	4·79
5/R ..	63·39	43·97	30,601	482·74	3,481·58	1,269·39	20·01	147·89	4·15
5/S...	15·87	12·87	5,107	321·80	4,649·35	258·79	16·31	227·65	5·07
5/Ee .	19·65	14·06	9,966½	507·20	4,431·12	473·00	24·07	218·23	4·75
5/Gg .	13·81	11·48	4,578	331·49	3,447·27	240·52	17·42	169·30	5·25
5/Kk	18·32	12·77	7,226½	394·46	5,047·81	365·12	19·93	241·51	5·05
5/Nn	17·81	14·90	10,721	601·96	4,393·41	498·21	27·97	213·60	4·65
5/Qq .	15	8·87	3,591	239·40	3,356·99	190·46	12·70	171·34	5·31
5/Rr	23	17·23	5,897½	256·41	2,873·97	322·81	14·04	154·87	5·47
5/Ss .	17	10·03	5,466½	321·56	3,144·99	278·52	16·38	157·25	5·10
5/Tt .	12	4·13	2,073½	172·79	5,103·72	123·65	10·30	259·75	5·99
5/Vv .	21	20·71	22,757½	1,083·67	4,636·34	804·63	38·32	196·61	3·54
5/Ww	23	21·74	11,761½	511·37	3,962·40	540·56	23·51	182·71	4·60
5/Xx	20	16·90	10,110	505·50	3,948·01	468·85	23·44	191·66	4·64
5/Yy	13	9·06	5,244	403·38	3,545·73	278·46	21·42	181·06	5·31
					Nov.-July			Nov.-July	
5/Zz..	28·71	8·48	4,413½	153·72	3,459·93	158·38	5·52	131·16	3·59
5Aaa	18·97	10·58	5,639	297·27	3,097·91	297·95	15·71	157·20	5·28
5/Bbb	16·23	8·32	4,066	250·52	2,741·81	211·66	13·04	140·93	5·21
					Jan.-July			Jan.-July	
5/Ccc	13	11	5,223½	401·81	1,501·30	219·29	16·87	68·86	4·20
Means	23·44	16·87	10,218·23	435·97	4,047·35	482·46	20·59	195·57	4·72

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR JULY, 1934.

Herd No	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during July.	Milk. Per Cow during July.	Milk. Per Cow March to July.	But erfat. Per Herd during July.	But erfat. Per Cow during July.	But erfat. Per Cow March to July.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	26	22·48	12,476	479·84	2,411·51	690·78	26·57	131·43	5·54
9/B ..	15	12·71	6,182	412·13	1,958·82	281·20	18·75	90·37	4·55
9/C ..	11·61	9	6,153	510·59	1,689·05	272·46	22·59	75·64	4·45
9/D ..	24	20·84	12,208½	508·69	2,566·09	692·39	28·85	136·94	5·67
9/E ..	13	8·39	3,434	264·15	2,101·10	170·57	13·12	98·16	4·97
9/F ..	17·90	14·29	12,911½	721·31	2,052·08	527·18	29·45	84·80	4·08
9/G ..	32·16	18·26	10,956	340·67	1,858·02	587·59	18·27	100·27	5·36
9/H .	18	16·06	13,365	747·88	2,887·91	536·27	30·02	121·94	4·01
9/I ..	36	14·90	7,056	196·00	903·87	283·15	7·87	37·27	4·01
9/J...	56·94	37·58	17,369½	305·05	1,349·21	816·00	14·33	61·16	4·70
9/K .	22	14·42	5,959	270·86	1,297·93	308·53	14·02	65·57	5·18
9/L .	28	19·23	12,385½	442·34	1,565·03	488·24	17·44	60.32	3·94
9/M	16	1	201½	12·59	58·91	10·88	·68	2·95	5·40
9/N .	36·23	30·35	21,310½	522·89	2,184·39	914·96	22·62	89·26	4·25
9/O .	24·48	12·84	8,321½	339·93	1,426·02	375·20	15·33	66·97	4·51
9/P .	48·26	36·52	19,338	400·70	1,397·55	903·16	18·71	65·58	4·67
					Apr.-July			Apr.-July	
9/Q .	15·52	14·81	6,372	410·56	1,810·69	307·69	19·82	85·23	4·83
9/R .	9	3·26	1,200½	133·39	600·67	59·74	6·64	33·18	4·98
					May-July			May-July	
9/S..	12	5·74	3,238½	269·87	996·83	157·21	13·10	44·83	4·85
9/T .	11·71	11·39	7,438	635·18	1,674·51	344·81	29·45	76·12	4·64
9/U .	15	11·35	4,813	320·86	1,116·73	250·28	16·69	60·48	5·20
					June-July			June-July	
9/V ..	10	8·13	3,552	355·20	727·20	190·86	19·09	38·16	5·37
Means	22·67	15·62	8,920·07	393·42	1,715·45	416·78	18·38	80·45	4·67

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.		
	1	92		
	2	80		
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	3	29	201	
	4	--		
	5	77		
	6	71	148	
				349
	7	80		
	8	97		
	9	81	258	
A. H. Matthews, Bridgewater	10	86		
	11	dead		
	12	45	131	
				389
	13	70		
	14	27		
	15	85	182	
G. W. T. Symes, Echunga	16	53		
	17	70		
	18	76	199	
				381
	19	90		
	20	53		
	21	dead	143	
E. B. Gliddon, Yundi	22	dead		
	23	66		
	24	35	101	
				244
	25	87		
	26	39		
	27	70	196	
T. Cleaver, Bridgewater	28	79		
	29	73		
	30	77	229	
				425
	31	65		
	32	67		
	33	42	174	
J. E. Assender, Echunga	34	59		
	35	69		
	36	41	169	
				343
	37	70		
	38	68		
	39	117	255	
S. Hill, Bridgewater	40	92		
	41	13		
	42	49	154	
				409
	43	104		
	44	95		
	45	59	258	
W. Restall, Echunga	46	59		
	47	58		
	48	89	206	
				464
	49	75		
	50	101		
	51	73	249	
C. Guthridge Yundi	52	11		
	53	46		
	54	59	116	
				365
	55	68		
	56	28		
	57	dead	96	
S. Lambert, Echunga	58	34		
	59	44		
	60	40	118	
				214
	61	79		
	62	91		
	63	46	216	
A. Young, Bridgewater	64	80		
	65	55		
	66	83	218	
				434
	67	77		
	68	57		
	69	79	213	
D. J. Foxwell, Echunga	70	50		
	71	75		
	72	37	162	
				375
	73	45		
	74	73		
	75	69	187	
J. C. Normandale, Yundi	76	86		
	77	83		
	78	87	256	
				443
	79	95		
	80	45		
	81	59	199	
L. W. Sando, Echunga	82	85		
	83	101		
	84	46	232	
				431
	85	84		
	86	108		
	87	52	244	
J. O. Marshall, Yundi	88	dead		
	89	69		
	90	45	114	
				358
	91	64		
	92	77		
	93	86	227	
Murray Powell, Jupiter Creek	94	dead		
	95	77		
	96	52	129	
				356

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934	
	97	84	
	98	86	
	99	76	246
S. Bridge, Yundi	100	20	
	101	dead	
	102	74	94
			340
	103	54	
	104	39	
	105	84	177
C. T. Rodger, Echunga	106	66	
	107	78	
	108	35	179
			356
	109	21	
	110	12	
	111	90	123
R. H. Smith, Yundi	112	18	
	113	81	
	114	15	114
			237
	115	33	
	116	57	
	117	78	168
Willow Bend Stud Poultry Farm, North Walkerville	118	—	
	119	42	
	120	53	95
			263
	121	25	
	122	62	
	123	96	183
C. MacDonald, Echunga	124	89	
	125	71	
	126	86	246
			429
	127	98	
	128	71	
	129	92	261
T. R. Smart Yundi	130	68	
	131	dead	
	132	98	166
			427
	133	52	
	134	49	
	135	71	172
Raymoor Poultry Farm, William Street, Kilkenny	136	80	
	137	79	
	138	38	197
			369
	139	35	
	140	85	
	141	106	226
B. R. Whittington, Yundi	142	37	
	143	57	
	144	69	163
			389
	145	1	
	146	92	
	147	57	150
W. A. Hazeal, 11, Rosetta Street, Rosewater	148	36	
	149	49	
	150	48	133
			283

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
	151	37	
	152	68	
	153	38	143
H. F. Muirson, Yundi	154	52	
	155	94	
	156	49	195
			338
	157	3	
	158	77	
	159	74	154
K. Pennack, Pooraka	160	94	
	161	72	
	162	65	231
			385
	163	63	
	164	62	
	165	89	214
C. A. L. Sandstrom, Yundi	166	83	
	167	79	
	168	36	198
			412
	169	29	
	170	30	
	171	65	124
G. A. Bielby, Pooraka	172	82	
	173	81	
	174	74	237
			361
	175	57	
	176	45	
	177	82	184
W. M. Field, Yundi	178	33	
	179	45	
	180	81	159
			343
	181	91	
	182	95	
	183	80	266
T. Duhring, Mallala	184	100	
	185	63	
	186	85	248
			514
	187	90	
	188	dead	
	189	29	119
W. R. Hedger, Yundi	190	67	
	191	99	
	192	—	166
			285
	193	67	
	194	75	
	195	73	215
A. & H. Gurr, Bradbury	196	86	
	197	99	
	198	75	260
			475
	199	69	
	200	79	
	201	52	200
J. V. McGinnis, Yundi	202	47	
	203	37	
	204	15	99
			209

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	88	
	206	66	
	207	89	243
	208	66	
	209	36	
	210	89	191
			434
W. C. Jones, Yundi	211	7	
	212	74	
	213	88	169
	214	84	
	215	72	
	216	21	177
			346
Langmaid & Bettison, Parafield, Salisbury	217	49	
	218	62	
	219	27	138
	220	47	
	221	82	
	222	58	187
			325
A. Jarvis, Yundi	223	57	
	224	57	
	225	44	158
	226	76	
	227	65	
	228	80	221
			379
S. Eyles, Clarendon	229	39	
	230	dead	
	231	80	119
	232	78	
	233	78	
	234	62	218
			337
Woodbury Poultry Farm, Stirling East	235	76	
	236	17	
	237	61	154
	238	—	
	239	37	
	240	52	89
			243
V. F. Gameau, Findon Road, Woodville	241	54	
	242	5	
	243	48	107
	244	17	
	245	55	
	246	49	121
			228
Geo. Lomax, Yundi	247	64	
	248	21	
	249	54	139
	250	41	
	251	—	
	252	62	103
			242
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	56	
	254	96	
	255	50	202
	256	20	
	257	11	
	258	27	58
			260

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
W. R. Williams, 28, Avenue Road, Frewville	259	104	
	260	58	
	261	5	167
	262	97	
	263	86	
	264	97	280
			447
R. W. McAllister, Yundi	265	55	
	266	29	
	267	73	157
	268	34	
	269	88	
	270	62	184
			341
G. W. Sykes, Yundi	271	53	
	272	60	
	273	58	171
	274	89	
	275	65	
	276	64	218
			389
A. P. Urlwin, Balaklava	277	79	
	278	67	
	279	81	
		227	
A. V. Dupen, Melton Street, Glenelg	280	61	
	281	104	
	282	32	
		197	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	61	
	284	103	
	285	51	
		215	
Thomas & Elson, Clifton Street, Hawthorn	286	53	
	287	33	
	288	68	
		154	
J. H. Dowling, Glossop, River Murray	289	65	
	290	79	
	291	68	
		212	
E. Pape, Wynarka	292	—	
	293	21	
	294	28	
		49	
L. S. Ekers, Mount Jagged Farm Mount Compass	295	64	
	296	58	
	297	65	
		187	
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	66	
	299	78	
	300	95	
		239	
L. R. Badcock, 77, Findon Road, Woodville	301	49	
	302	57	
	303	61	
		167	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	76	
	305	72	
	306	96	
		244	
Gallagher & Aslin, Pooraka	307	103	
	308	70	
	309	59	
		232	
R. C. Crittenden, William Street, Kilkenny North	310	75	
	311	50	
	312	50	
		175	
C. H. Lines, Junr., Gladstone	313	76	
	314	69	
	315	75	
		220	
A. J. Monkhouse Woodside	316	82	
	317	32	
	318	42	
		156	
B. Cooke, Kanmantoo	319	105	
	320	104	
	321	91	
		300	
Gallagher & Aslin, Pooraka	464	68	
	465	84	
	466	75	
		227	

The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
W. C. Slape, Magill	467	39	
	468	55	
	469	64	
		158	
Willow Bend Stud Poultry Farm, North Walkerville	474	104	
	475	7	
	476	69	180
	477	45	
	478	106	
	479	102	253
			433
Total Class 1. ...		20,248	

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	34
	323	5
	324	22
		61
G. Frisby Smith, Fulham (Minorcas)	325	29
	326	57
	327	63
		149
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	22
	329	70
	330	60
		152
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	38
	332	91
	333	78
		207
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	23
	472	58
	473	79
		160
Total Class No. 2.		729

Class No. 3.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
H. J. Mills, 108, Edward Street Edwardstown	334	86	
	335	88	
	336	87	261
	337	81	
	338	96	
	339	122	299
			560
A. G. Dawes Portrush Road, Glenunga Gardens	340	113	
	341	26	
	342	75	214
	343	52	
	344	74	
	345	82	208
			422
Willow Bend Stud Poutry Farm, North Walkerville	346	99	
	347	81	
	348	55	235
	349	66	
	350	31	
	351	16	113
			348
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	61	
	353	51	
	354	81	193
	355	40	
	356	95	
	357	65	200
			393
A. C. Byrne, 114, Rose Terrace, Wayville West	358	82	
	359	71	
	360	59	212
	361	68	
	362	35	
	363	59	162
			374
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	95	
	366	93	
		226	
C. H. Lines, jun. Gladstone	367	80	
	368	35	
	369	3	
		118	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
J. H. Dowling, Glossop, River Murray	370	13	
	371	48	
	372	15	
		76	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	69	
	374	80	
	375	81	
		230	
Mrs. M. Specht, Holder Avenue, Richmond	376	99	
	377	65	
	378	87	
		251	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	47	
	380	75	
	381	8	
		130	
G. Frisby Smith, Fulham House, Fulham	382	82	
	383	33	
	384	38	
		153	
B. Cooke, Kanmantoo	385	96	
	386	98	
	387	102	
		296	
Willow Bend Stud Poultry Farm, North Walkerville	480	102	
	481	74	
	482	84	260
	483	61	
	484	92	
	485	71	224
			484
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	109	
	459	76	
	460	121	
		306	

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Total Class No. 3.		4,367	

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.	
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	65	
	389	94	
	390	53	212
	391	77	
	392	93	
	393	86	256
			468
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	56	
	395	97	
	396	102	255
	397	94	
	398	45	
	399	89	228
			483
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400	57	
	401	50	
	402	96	
		203	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	39	
	404	70	
	405	77	
		186	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	55	
	407	102	
	408	95	
		252	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	73	
	410	36	
	411	37	
		146	
K. Pennack, Pooraka (Barnevelders.)	412	89	
	413	54	
	414	93	
		236	
G. W. Lindsay, Torrens Road Kilkenny (Langshans.)	461	33	
	462	44	
	463	73	
		150	
Total Class No. 4.		2,124	

Class No. 5—White Leghorns.

A. O. Dawkins, Gawler	415	60	
	416	57	
	417	45	162
	418	72	
	419	95	
	420	80	247
			409
A. V. Dupen, Melton Street, Glenelg	421	42	
	422	23	
	423	90	
		155	
A. J. Monkhouse, Woodside	424	93	
	425	76	
	426	79	
		248	
Total Class No. 5.			812

Class No. 7.—Black Orpingtons.

A. C. Byrne, 114, Rose Terrace, Wayville West	427	37	
	428	38	
	429	46	121
	430	65	
	431	81	
	432	71	217
			338
G. Frisby Smith, Fulham House, Fulham	433	84	
	434	77	
	435	101	
		262	
Total Class No. 7.			600

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Sept. 8th, 1934.
Home Project Utility Section.—Wet Mash.		
John Plummer, Virginia School	436	60
Dudley Harper, Murray Bridge School	437	61
Jack Beauchamp, Murray Bridge School	438	35
Jack Beauchamp, Murray Bridge School	439	47
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	92
Stanley Pratt, Abattoirs School	442	76
Mervyn Steer, Sturt School	443	88
Donald Welford, Westbourne Park School	444	70
E. Zbierski, Gawler School	445	83
J. McInerney, Gawler School	446	50
F. Martin, Gawler School	447	87
Darcy Coleman, Mallala School	448	62
Kevin Angus, Mallala School	449	53
Alwin Scott, Wellington Road School	450	76
Jack Dietman, Wellington Road School	451	84
Milton Smith, Salisbury School	452	109
Owen Robinson, Ascot Park School	453	43
Paul Mundy, Urrbrae High School	454	63
Max Couche, Thebarton School	455	94
Robert Swift, Murray Bridge School	456	100
Bruce Dooland, Thebarton Central School	457	23
Ian Slee, Two Wells School	470	47
Total		1,503

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at the Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED SEPTEMBER 8th, 1934.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	117	39
J. O. Marshall	108	86
Willow Bend Stud Poultry Farm	106	478
B. R. Whittington	106	141
Trios—		
B. Cooke	300	319–321
W. R. Williams	200	262–264
T. Duhring	266	181–183
Teams—		
T. Duhring	514	181–186
A. & H. Gurr	475	193–198
W. Restall	464	43–48

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	91	332
Langmaid & Bettison (Minorca)	79	473
A. Heaysman (Cuckoo Leghorn)	78	333
Trios—		
A. Heaysman (Cuckoo Leghorns)	207	331–333
Langmaid & Bettison (Minorcas)	160	471–473
V. F. Gameau (Minorcas)	152	328–330

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	122	339
F. F. Welford	121	460
A. G. Dawes	113	340
Trios—		
F. F. Welford	306	458–460
H. J. Mills	299	337–339
B. Cooke	296	385–387
Teams—		
H. J. Mills	560	334–339
F. F. Welford	536	373–375 and 458–460
Willow Bend Stud Poultry Farm	484	480–485

Class 4.—Any other Heavy Breeds.

Singles—		
A. G. Dawes (Rhode Island Reds)	102	396
Woodbury Poultry Farm (Rhode Island Red)	102	407
A. G. Dawes (Rhode Island Red)	97	395
Trios—		
A. G. Dawes (Rhode Island Red)	256	391–393
A. G. Dawes (Rhode Island Red)	255	394–396
Woodbury Poultry Farm (Rhode Island Red)	252	406–408
Teams—		
A. G. Dawes (Rhode Island Red)	483	394–399
A. G. Dawes (Rhode Island Red)	468	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—		
A. O. Dawkins	95	419
A. J. Monkhouse..	93	424
A. V. Dupen..	90	423
Trios—		
A. J. Monkhouse	248	424–426
A. O. Dawkins	247	418–420
Teams—		
A. O. Dawkins	409	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	101	435
G. Frisby Smith	84	433
A. C. Byrne	81	431
Trios—		
G. Frisby Smith	262	433–435
Teams—		
A. C. Byrne..	338	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Milton Smith, Salisbury (White Leghorn) ..	109	452
Robert Swift, Murray Bridge (Black Orpington)	100	456
Max Couche, Thebarton (Rhode Island Red)	94	455
Eric Pratt, Abattoirs (White Leghorn).. ..	92	441
Mervyn Steer, Sturt (White Leghorn)	88	443

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to August 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to July 31st, 1934.	No. Eggs Laid Month of August, 1934.	Total Eggs Laid April 1st, 1933, to August 31st, 1934.
No. 1 test	8,864	841	9,705
No. 2 test	8,237	677	8,914
No. 3 test	7,856	761	8,617
No. 4 test	9,238	727	9,965
No. 5 test	4,217	584	4,801

AGRICULTURAL BUREAU CONFERENCES.

SOUTHERN CONFERENCE.

There was a large attendance of members at the Southern Conference at Strathalbyn on August 16th. Mr. C. M. Hudd presided and the Branches represented were Ashbourne, Belvidere, Blackheath, Brinkley, Currency Creek, Echunga, Finniss, Hartley, Inman Valley, Langhorne's Creek, Milang, Mount Compass, Murray Bridge, Narrung, Port Elliot, Strathalbyn, and Yundi.

Officers present were Messrs. A. J. Cooke (Chairman of the Advisory Board of Agriculture, who delivered the opening address), W. J. Spafford (Deputy Director of Agriculture), C. F. Anderson (Poultry Expert), H. B. Barlow (Chief Dairy Instructor), H. H. Orchard (District Horticultural Instructor), A. H. Robin Veterinary Officer of the Stock and Brands Department), C. A. Goddard (Assistant Wool Instructor to the School of Mines), and H. C. Pritchard (General Secretary Agricultural Bureau). Mr. F. W. Allison acted as local Secretary.

In his opening address Mr. Cooke made special reference to the agricultural conditions of South Australia, which on account of the recent rains were more hopeful than appeared previously. Fluctuations in the price of wheat due to indifferent seasonal characteristics in countries where wheat was grown promised better prospects in the wheat industry than had been expected for some time. In regard to other lines of production, such as dairying and poultry raising, the conditions were a little better than they were last year. At the time of the Conference, legislation had not been passed in South Australia for the marketing of dairy produce, and prices were lower than applied to the other States. Whatever legislation was adopted, it was hoped that farmers would at least get the same advantages under a State scheme as they would under the Federal Act. He had no brief for either scheme, but he was of the opinion that in a season of plenty, with large exports, the Federal scheme would be better, but with a lean season, with little export surplus, the proposed State scheme would probably be more advantageous to the farmer. The outlook for the poultry industry, too, was better than last year. The export season had opened well, and he thought that the prices would be equal if not higher than the previous season.

Papers were read by Mr. A. H. Paterson (Strathalbyn), on "Farm Management"; Mr. G. Sissons (Strathalbyn), "Almond Growing"; Mr. D. J. Turvey (Milang), "Care and Management of the Poultry Yard"; Mr. B. St. J. Proctor (Mount Compass), "Some Remarks on the Characteristics, Classification, and Marketing of Wool."

In addition to assisting in discussions on the papers, officers of the Department replied to questions on the following subjects:—The best stages to cut meadow hay and the best method of manufacture, the low quality of wheats grown in South Australia, the best breed of ram for fat lamb raising, the symptoms of bot flies and blood worms and treatment, cure for chronic greasy heel in draught horses, the best method of marking lambs, treatment of impotent bulls, treatment of sows at farrowing time, the best treatment for a cow that has eaten wheat, and the use of strychnine in a poison bait.

It was decided to hold the next Conference at Mount Compass.

After a short discussion on licensing veterinary surgeons, it was resolved that the Congress Committee be requested to include the question of the appointment of veterinary officers for country districts on the Congress agenda.

In the evening delegates attended the public meeting convened to hear Mr. C. F. G. McCann (Trade Commissioner for South Australia) speak on "Products for Overseas Markets."

AGRICULTURAL BUREAU CONFERENCE AT COROMANDEL VALLEY.

The Annual Conference of Hills Branches was held at Coromandel Valley on Thursday, August 23rd, 1934, under the auspices of the Blackwood Branch. Mr. J. Turner occupied the chair. Delegates were present from Branches situated at Clarendon, Blackwood, Lenswood and Forest Range, Gumeracha, Cherry Gardens, Scott's Bottom, Ironbank, Balhannah, and Longwood. The Department of Agriculture was represented by Messrs. W. J. Spafford (Deputy Director of Agriculture), G. Quinn (Chief Horticultural Instructor), R. Fowler (Manager Government Experimental Orchard), H. H. Orchard (District Horticultural Instructor), and H. C. Pritchard (General Secretary Agricultural Bureau).

Mr. H. N. Wicks (Advisory Board of Agriculture) delivered the opening address. He stressed the necessity for growers to eliminate anything but the best fruit and of the best varieties, if they were to retain their place on overseas markets. A great many varieties of very little value were now being grown, and these must be replaced by good varieties. Cheaper production methods should also be attempted. This could be achieved by such means as the combining of sprays, also the use of power machines in orchards which were not large enough to provide paddocking for draught stock. The export variety list was far too large. Only those varieties which could be grown to perfection should be retained. In the knowledge of working over trees to new varieties Australia was very backward. There was a need for an institution to supply horticultural instruction, particularly in South Australia. Such an institution would educate orchardists in the best methods of carrying out the various orchard practices.

Papers were read by Mr. R. Fowler on the "Green Peach Aphis," and Mr. Max Vickers (Lenswood) on "Orchard Drainage"; and a paper supplied by Mr. W. A. Robinson (Gumeracha) on "The Care of the Lambing Flock." Numerous questions were answered by Messrs. Quinn, Spafford, and Fowler, and the following resolutions were passed:—"That this Conference affirms other resolutions asking for the enforcement of the Insecticides Act provisions which demand that the analysis of the contents be printed on the container"; "That this Conference supports the Bill now before Parliament which provides for grade standards, so that the sale of poor quality fruit be prohibited"; "That all Fruit Inspectors be more strict in enforcing the law regarding unsprayed orchards"; "That legislation be enacted to have the time set out on weighbridge cartnotes, *i.e.*, the time when the load is weighed, and also to have deleted from cartnotes the name whom the goods are for"; "That the Pure Foods Regulations relating to vinegar be enforced"; "That the Government be asked to make the services of a veterinary surgeon available to producers, under the control of the Department of Agriculture." It was decided to hold the next Conference at Lenswood. During the day a Life Membership Certificate was presented to Mr. A. K. Ashby, of Blackwood, by Mr. W. L. Summers.

CONFERENCES ON EYRE'S PENINSULA.

Branches of the Agricultural Bureau held two Conferences on Eyre's Peninsula at Yeelanna and Kyancutta, on September 5th and 9th respectively. The Department of Agriculture was represented by Messrs. A. J. A. Koch (Advisory Board of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), H. D. Adams and W. H. Brownrigg (Agricultural Instructors), and H. C. Pritchard (General Secretary).

YEELANNA.

When opening the conference at Yeelanna, Mr. Koch congratulated the members on the splendid condition of their crops this year, and he considered that the seasonal prospects were with Eyre's Peninsula. He had associations many years ago with the districtc and he now found that what was once a wilderness was now studded with attractive and prosperous-looking farms. Because of their zeal to convert mallee areas into smiling farms in the past, the mallee farmer had been inclined towards over-expenditure. Farmers generally had taken a short view and had not planned their work sufficiently far ahead. There was a tendency to finance the farm from year to year without looking into the future. The farmer should strive to reach his objective over a period of time, and arrange his finances accordingly. Further, there was a need for the farmer to be a manager rather than a farm worker. If he looked upon the complete control of a farm as a one-man job, it was doubtful if he could give the farm as much attention as it deserved. The experience of years should be used to multiply the departments of the holding, which should be as much a factory as a farm. While wheat, oats and barley could not be made profitable at present prices by direct selling, means should be found to market these products through eggs, sheep, bacon, &c.

The following papers were read by members:—"Seed Wheat," Mr. R. R. Wilson (Yeelanna); "Better Wheat Marketing Methods," Mr. E. A. Pfeiffer (Cummins); "Stabilising the Wheat Industry," Mr. G. A. Vigar (Mount Hope); "Care of Farm Machinery," Mr. W. E. Bryant (Cummins); "Tomato Growing in the Open for Cummins and Yeelanna Districts," Mr. R. Granit (Cummins); "Some Aspects of Mortality among Sheep from eating Stinkwort," Mr. M. T. Gardner (Koppio). Questions were answered by Departmental Officers on subjects such quality in South Australian wheats, encouraging stock to eat ensilage, the control of takeall, the control of salt patches, the treatment to stimulate grass and cereals, the origin of drake in crabhole country, the germination of wild oats, and the control of blowflies.

The following resolutions were carried:—"That the Advisory Board confer with the wheat merchants with a view to amending the present system of buying wheat and docking for second-hand bags or refusing same, and asking that agents be granted power to use discretion in accepting wheat delivered in good, sound bags." "That the tariff on farming implements be reduced considerably." "That the sales tax on lubricating oils and greases used in the production of power by primary producers be abolished." "That further funds sufficient for developmental needs be made available for construction of roads in newer settled areas north and west of the hundred of Koppio." "That all discounts available to Farmers Assistance Board, be credited to applicants under Assistance, instead of as at present retained by the Board." "That this Conference asks the Advisory Board to ask the superphosphate manufacturers for a reduction of 5 per cent. for cash on purchase price of super." "That the next Conference be held at Cummins."

Mr. H. B. Barlow addressed the evening session on the Dairying Industry.

PIGKEEPING.

The Library of the Department of Agriculture has received from the Ministry of Agriculture, England, a copy of Bulletin No. 32, "Pig-Keeping," 62 pages, prepared by W. A. Stewart, M.A., B.Sc., Principal of the Moulton Farm Institute, Northampton. Separate chapters deal with breeding, feeding, pigsties, open air pig-keeping, pig-keeping, &c., as well as a number of plans of sties and pig rearing houses together with illustrations of the types of pig required by the English market are included in this most useful bulletin. The London price of the Bulletin is 1s. 6d. net.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 8.—THE PURPLE-STEMMED OR HORNY THORN APPLE.

Datura Tatula, L.

The Thorn Apples are solanaceous plants belonging to the genus *Datura,* of which there are some twelve or more species widely distributed throughout the tropical and temperate regions of both worlds. They are noted for their trumpet-shaped flowers and capsular fruits, the latter usually having an external covering of thorns or prickles, and liberating, when mature, large numbers of reniform compressed seeds. The flowers of some species are very large; for example, in the Angel's Trumpet, *Datura suaveolens,* a native of Mexico and often cultivated in gardens under the name *D. arborea,* the white pendulous blooms may be nine inches or more in length; in other species they are smaller, but only rarely are they less than two inches long, the colour being usually white or purple. All the species are more or less poisonous, due to their containing powerful alkaloids, and a number of them yield drugs of importance in medicine. *Datura Tatula,* the species here to be described, is probably only a varietal form of the common Thorn Apple, *Datura Stramonium,* L., a cosmopolitan weed, believed to be native to the shores of the Caspian Sea. There is some difference of opinion as to the native home of *D. Tatula*; according to some authorities it is of European or Asiatic origin, while others maintain that it is a native of tropical America. Both species, however, have been introduced into most temperate countries.

Relationship between Stramonium and Tatula.—*Datura Stramonium,* known as "Jamestown-weed" or "Jimson-weed" in the United States, is the best-known Thorn Apple. The drug Stramonium, which is widely used in the treatment of asthma, consists of the dried leaves of this plant. It resembles *D. Tatula* very closely both in structure and poisonous properties, the chief difference being one of colour; in Tatula there is a red or purple colouration of the stems and main leaf-veins, and the flowers are purple or pale blue, whereas in Stramonium the vegetative parts are green and the flowers white. There is also a slight difference in the fruit which, in both species, is an ovoid spiny capsule about as large as a walnut. The spines are all about the same length in Tatula, while they tend to become shorter towards the base in Stramonium. The two plants were originally described by Linnaeus as separate species, but it is probable that the one is merely a variety of the other; such indeed, is the view adopted in the Index Kewensis, in which *D. Tatula* is listed as a synonym for *D. Stramonium.* De Vries, in his great work, The Mutation Theory, points out that the gain or loss of a single character is not sufficient to justify the conferring of specific rank upon a given plant form, and inasmuch as variation is known to occur in the development of the spines on the fruits in both Stramonium and Tatula, it would seem that the colour difference is the only really constant character separating the two forms.

The production of red or purple sap, such as, for example, occurs in beetroot, and in the foliage of many garden plants, is a phenomenon of widespread occurrence in the vegetable kingdom. These pigments are called anthocyanins, and they differ from other plant pigments in being dissolved in the watery sap of the cells, instead of being contained within definite corpuscles. Anthocyanins are commonly found in seedlings and young developing shoots, especially during cold weather. For instance the leaflets of young plants of the white clover (*Trifolium repens*) often show a bright red colouration of the main veins during winter months. The full significance of this anthocyanin formation is not known, but physiologists are agreed that it is bound up in some way with the conditions of temperature and illumination to which the plants are subjected. On the other

hand the capacity to form anthocyanins under a given set of conditions is part of the native constitution of a plant, and as such is transmitted in accordance with the rules governing the inheritance of other characters. Such tendencies may arise, or become more pronounced, by mutation, and lead to abnormal colouring of foliage and other parts usually green, and so to the production of forms with an ornamental value. By applying the methods of breeding and selection to such forms horticulturalists have produced a multitude of ornamental plants greatly prized by the public on account of their red or purple, but none the less abnormal, colours. It is this capacity to form anthocyanins that distinguishes *Datura Tatula* from *D. Stramonium*, and accounts for the purple flowers and red stems and leaf-veins of the former plant. When the two forms are crossed the resulting F.1. plants have red stems and purple flowers, the colour being, however, less intense than in the Tatula parent; in the following or F.2. generation there is evidence of typical Mendelian segregation into Tatula, Stramonium, and forms similar to the F.1. generation. De Vries regards Tatula as the older of the two, the Stramonium form having arisen by variation in the direction of *albinism*, or *loss* of the capacity to form anthocyanin; according to this conception Stramonium is a variety of Tatula, instead of the latter being one of Stramonium. It is worthy of note that the Indian species, *Datura fastuosa*, has both purple-flowered and white-flowered forms, the former being regarded as the type, while the latter is distinguished as the variety *alba*. In view of the uncertainty as to the correct botanical name to be given to this plant, the present article retains the specific rank of Tatula as a matter of convenience. Moreover, it is shorter to write *D. Tatula* than *D. Stramonium* var. *Tatula*.

Confusion with the Castor Oil Plant.—The dry summer conditions which obtain throughout the greater part of this State are not very favourable to the growth of the Thorn Apple. When gathered the plants wilt very quickly, and while an occasional specimen is seen growing on the roadside, the Thorn Apple prefers sheltered situations, and is to be found most often along the banks of rivers and creeks, where shade and moisture are obtainable. Another plant which thrives under precisely similar conditions is the Castor Oil Plant, *Ricinus communis*, L. This also bears spiny fruits, and Datura is, as a consequence, often confused with it. Both plants have a peculiar, rather sickly, but readily distinguishable odour, and a reddish colouration of the leaves, more uniform than in Datura, is extremely common in Ricinus. But beyond this point all resemblance ends. The Castor Oil Plant, in the first place, grows to the size of a small tree, and it bears very large leaves which are almost circular in outline, but palmately divided into triangular serrate lobes; the Thorn Apple, on the other hand, is merely a herb and is rarely above five feet high; it bears ovate leaves which are sinuate-toothed, and though some are large, usually they are considerably smaller than those of Ricinus. Then, the flowers and fruits of Ricinus are crowded together in a conspicuous raceme-like inflorescence, whereas those of Datura are borne singly in the forks of the branches. Again the spiny fruit of the Castor Oil Plant is globular in shape and only about half the size of that of the Thorn Apple; when mature is breaks up into three portions, each containing a single seed about as large as a grain of corn; the larger ovoid fruit of Datura bursts by separation of its outer walls in the manner shown in the accompanying plate (Fig. C.), and sets free the very numerous seeds, each one many times smaller than a Castor Oil seed. Finally, though the seeds of the Castor Oil Plant are poisonous, the rest of the plant is harmless enough and is readily eaten by stock, while the entire plant of Thorn Apple is poisonous, and is usually left alone by grazing animals.

Botanical Name and Classification.—The words *Datura* and *Tatula* are really one and the same. Both are derived indirectly from the Sanscrit *dhustura* or *dhattura*, words meaning "insane" and applied as names to certain species of the genus. The poisonous properties of the plants were well-known to the ancients,

and the names were doubtless in allusion to the symptoms of wild delirium produced. The Arabic equivalent is *tatorah*. *Datura* comes through the modern Indian name *dhatura*; *Tatula* is said to be the Turkish corruption of *dhatura*, through the Persian.

The Daturas belong to the *Solanaceae* or Nightshade family, which is the one including the Apple of Sodom (*Solanum sodomaeum*), of which an account was given (in Article No. 4. of this series) in the issue of this *Journal* of March 1934. Mention was there made of the more important solanaceous plants growing in this State, and a description was given of the characters of the family, all of which are well shown by the genus *Datura*.

The Genus Datura.—*Datura* is readily distinguished from other genera of *Solanaceae* by a number of characters. Firstly, the flower has a five-toothed calyx which is usually more or less inflated; and it subsequently separates transversely so as to leave a collar around the base of the thorny fruit. The corolla is trumpet-shaped, consisting of a long tube and an expanded limb, the latter being folded in the bud. The stamens are enclosed within the corolla-tube, the slender anthers opening lengthwise, and not by terminal pores as in *Solanum*. The fruit is a capsule, opening septifragally at the summit by four valves, the very numerous seeds being compressed, rather small, reniform, and somewhat wrinkled.

The number of species given by different authorities varies from 12 to about 25. The species are widely distributed throughout temperate and tropical parts of Europe, Asia, and America. One species, *D. Leichhardtii* is native to Australia, and occurs in the Northern parts of this State. The classification into species presents considerable difficulties owing to the many varietal forms growing in certain countries, particularly in India where the Daturas have been and are still to some extent cultivated. G. Watt, in the Dictionary of the Economic Products of India, remarks that many peculiar forms are probably escapes from a former cultivation; that in many Indian localities the plants are only semi-wild, and have all the appearance of a degenerated offspring of a cultivated stock, once more generally cared for than that of the present day.

Description of D. Tatula.—An erect annual, 1-5ft. high, glabrous or the young parts sparingly pubescent, the stems and main leaf-veins reddish-purple. Leaves thin, ovate in outline, acuminate at the apex, mostly narrowed at the base, 3-8in. long, irregularly sinuate-lobed, the lobes acute, petioles 1-4ins. long. Flowers pale-purple or blue, solitary on short terminal peduncles arising between the forks of the branches, and remaining erect in the fruit; calyx prismatic, less than half the length of the corolla; corolla about 4in. long, the limb 1½-2in. in diameter when expanded. Capsule erect, ovoid, about 2in. long, thickly clothed with prickles which are not noticeably shorter at the base. In flower, most of the year.

Properties.—The poisonous nature of the Daturas is due to the presence in all parts of the plants of an alkaloid hyoscyamine, together with varying amounts of the isomeric, and perhaps better known substance, atropine, the mixture of the two being sometimes referred to as daturine. Chemically hyoscyamine is an ethereal salt, and consists of an alkaloid *tropine*, which is both a nitrogenous base and an alcohol, in combination with an aromatic acid, *tropic acid*. The compound exists in two forms, a "right-handed" or dextro-rotatory, and a "left-handed" or laevo-rotatory form. Hyoscyamine proper is the "left-handed" or laevo-form; atropine is a mixture of equal parts of the two forms. Since the "right-handed" or dextro-form is relatively inactive physiologically, both atropine and hyoscyamine are, from a physiological point of view, similar, the former being, however, somewhat weaker and so relatively less active than the latter.

Thus the symptoms of poisoning by Stramonium and other species of *Datura* are essentially similar to those due to Belladonna, and other substances containing atropine. The same alkaloids occur in a number of solanaceous plants, though the proportions vary, and the resulting symptoms may be complicated by the presence of varying amounts of other alkaloids as well.

The dominant action of atropine and hyoscyamine is to depress the activity of nerve endings, and so to prevent the proper functioning of tissues and organs controlled by the nerves concerned. Thus the salivary and sweat glands are paralysed, causing dryness of the mouth, intense thirst, difficulty in swallowing, and dryness of the skin. The pupil of the eye is widely dilated, and accommodation is paralysed, due to the action of the poison on the ends of the main nerve supplying the eye-muscles. Then there is a rapid acceleration of the pulse due

Thorn Apple. Photograph showing branching habit (see coloured plate opposite).

to interference with the "braking mechanism" of the heart-beat, that is to say, to paralysis of the ends of nerves whose normal function is to slow down the heart-beat. Again, there is relaxation of the muscular coats of the bronchial tubes in the lungs, due to paralysis of the ends of nerves supplying these muscles—hence the value of the drug in the treatment of asthma. Then again there is flushing of the face and other parts of the skin, due probably in the first instance to relaxation of the muscular walls and hence to dilatation of the smaller blood-vessels, though the same effect is later due to a depressant action on that part of the brain which regulates blood pressure.

THE PURPLE-STEMMED THORN APPLE (*Datura Tatula L.*).

About a third natural size.

A.—Flower laid open to show the arrangement of the five stamens and pistil.

B. —The fruit in transverse section.

C —The fruit, showing the leathery pericarp, dehiscing by four valves.

In addition to such peripheral effects due to action of the poison on the ends of nerves remote from the brain and spinal cord, atropine and hyoscyamine act centrally on the brain itself. The most noticeable effect is upon the higher brain centres, these being strongly excited, causing prolonged delirium, the symptoms sometimes resembling those of delirium tremens or acute mania. The poison also first stimulates and then depresses those centres in the brain which control the pulse, the blood-pressure, and respiration. Death, when it occurs, is usually due to heart failure combined with asphyxia due to depression of respiration. If recovery takes place the patient may have no recollection of his illness..

Uses.—The only uses of the plants are those connected with their poisonous properties, and may be classed as medical and criminal. As regards the former, the chief use of Stramonium is in cases of asthma, for which it is particularly valuable, the drug being taken either internally, or else by smoking cigarettes made from the dried leaves. Strangely enough, this use of the plant seems to be relatively modern. It was probably not known to the Romans, in fact, it is doubtful whether the plant was used at all in Roman medicine. On the other hand there is evidence for believing that the poisonous properties of the Daturas were well-known to the ancient inhabitants of India, and that the use of these plants for both medicinal and criminal purposes goes back to remote antiquity. The seeds of *Datura Tatula* and *D. Metel* are stated to have been used to produce frenzied ravings by priests in Delphic and some other temples, and those of *D. sanguinea* are said to have been used for a similar purpose in Peru. In India the Daturas are used for many purposes where Belladonna would probably be employed in the west. Datura seeds are regarded by the Indians as a cure for hydrophobia, and are used by them medicinally in the treatment of mania, convulsions, and epilepsy, which usage suggests the homæopathic dictum, *similia similibus curantur.*

As regards criminal uses, the seeds of *D. fastuosa* and other species are known to enter into the composition of certain alcoholic beverages which render the consumers literally mad. By this and other means the poisons are used in India, not only for purposes of murder, but also for stupefying victims with a view to robbery. Accounts given of these practices, written in the sixteenth century, are said to be just as true of India to-day as at the time they were written. Some of the descriptions are quaint and amusing to read, but they reveal, on the part of the natives, an astonishingly accurate knowledge of the drug and its effects upon the prospective victims. The following, which is taken from G. Watt's Dictionary of the Economic Products of India, is part of an account, published in 1596, of a Voyage to India by Huyghen van Linschoten, the plant concerned in this case being probably *D. fastuosa.*

> "They have likewise an hearbe called Deutroa which beareth a seed, whereof bruising out the sap they put into a cup or other vessel and give it to their husbands, eyther in meate or drinke and presently therewith, the man is as though hee were halfe out of his wits, and without feeling, or else drunke (doing nothing but) laugh, and sometimes it taketh him sleeping (whereby he lieth) like a dead man. . . . In which sort he continueth foure and twentie hours long, but if they wash his feete with colde water hee presently reviveth and knoweth nothing thereof but thinketh he had slept."

Eradication.—The Thorn Apple does not offer a difficult problem of eradication. In most situations the plants are not numerous, though dense infestations are sometimes found along river banks. The plants should be uprooted whenever found, and, if seed capsules are present, should, if possible, be piled in heaps and burnt.

REFERENCES.

1. De Vries, H., "The Mutation Theory" (translated by J. B. Farmer and A. D. Darbishire), London, 1910.
2. Hale White, "Materia Medica, Pharmacy, Pharmocology, and Therapeutics," London, 1918.
3. Watt, G., "A Dictionary of the Economic Products of India," III., London, 1890.
4. Watt, Sir G., "The Commercial Products of India," London, 1908.
5. Wheldale, Miss M., "The Anthocyanin Pigments of Plants," Cambridge, 1916.

STATE OF SOUTH AUSTRALIA.

SUMMARY OF LIVESTOCK STATISTICS, YEAR 1933.

[By W. L. JOHNSTON, Government Statist.]

I. SHEEP AND WOOL.

1. *Number of Sheep.*—The sheep flocks on December 31st, 1933, numbered 7,941,060, exceeding the record of 7,713,236 in 1932, the next highest being 7,646,239 in 1891. Compared with 1932, there was an increase of 227,824. The flocks were classified as follows:—Ewes, 4,073,611 (3,815,513); wethers, 2,079,515 (1,788,094); rams, 100,169 (97,858). Under one year old, 1,687,765 (2,011,771).

2. *Breeds of Sheep.*—86.6 (86.7) per cent. of the flock were returned as pure-bred Merino and 5.9 (5.3) per cent. Merino comebacks; 1.4 (1.0) per cent. other pure breeds (Corriedale, Shropshire, Dorset Horn, Lincoln, Romney Marsh, Southdown, Suffolk, etc.), and 6.1 (7.0) per cent. crossbreds.

3. *Lambing,* 1933.—During 1933 3,304,532 (3,127,432) ewes were mated and 2,051,130 (2,270,081) lambs marked; percentage, 62.07 (72.59).

4. *Winter Lambing,* 1934.—3,480,000 ewes were reported as either mated or intended to be mated for the winter lambing of 1934. In addition 110,000 ewes were expected to be reserved for spring lambing. Details for the 1934 winter lambing, which has naturally been affected by the dry spell, are now being obtained and will be published later.

5. *Wool Clip.*—8,111,296 (7,573,237) sheep and lambs were shorn, the total clip including locks, bellies, pieces, &c., being 67,668,282 (65,154,632) lbs.; increase 2,513,650lbs. The average fleece for sheep and lambs combined was 8.34 (8.60) and for sheep only 9.81 (10.42) lbs.

6. *Total Wool Production.*—Subject to slight revision, it is estimated that the grand total wool production, including the clip and wool fellmongered and wool on local skins exported, was 79,500,000 (75,727,946) lbs.; increase, 3,772,054lbs., value £4,625,000 (2,309,702); increase, £2,315,298; the average value per lb. greasy being 13.96d. (7.32d.).

II. CATTLE.

1. *Numbers.*—All kinds, 352,728 (312,932); increase, 39,796. Dairying cattle, 163,875 (149,172); increase, 14,703, classified as follows:—In milk, 110,551 (101,974); dry, 36,930 (29,508); and heifers springing, 16,394 (17,690). In addition there were 22,211 (18,129) other heifers one year and over, which are possible additions to the dairying herds. The dairy cattle number was a record, and total cattle highest since 1925.

2. *Butter and Cheese.*—Provisional 1933-34 butter, 19,700,000lbs. and cheese, 5,130,000lbs., have only been exceeded by the previous year's production of 21,310,006 and 6,093,170lbs. Overseas exports were:—Butter, 8,308,420 (9,500,027) lbs.; cheese, 667,172 (1,578,780) lbs.

III. HORSES, 196,789 (190,222); increase, 6,567, being highest since 1928.

IV. PIGS, 91,573 (113,831); decrease, 22,258.

V. GOYDER'S LINE OF RAINFALL AND LIVESTOCK.

During the year 1933 the percentage to the total of sheep outside Goyder's Line of Rainfall decreased from 37.72 to 34.30; cattle increased 28.51 to 29.30; and horses 26.81 to 27.59. The numbers within and without the line for 1933 were sheep 5,217,669 and 2,723,391, cattle 249,387 and 103,341, horses 142,490 and 54,299.

VI. Interstate Movement of Stock.

The State gained 27,604 head of cattle, 265,297 sheep, and 2,011 horses by transit of stock between States. The total interstate imports were sheep 320,121, cattle 39,684, horses 3,540, and export sheep 54,824, cattle 12,080, horses 1,529. Net exports of horses to overseas countries 245.

VII. Slaughtering.

Sheep and lambs, 1,495,127 (1,279,245); cattle, 104,488 (89,350); pigs, 167,526 (150,318). For the year ended June, 1934, 216,535 (53,863) carcasses of lambs were exported and 746,884 (193,055) lbs. of pork.

VIII. Value of Pastoral and Dairying Industries.

Provisional for 1933-34, £7,100,000 (£4,744,161); increase £2,355,839.

1. Livestock as at December 31st, 1933, in Comparison with December 31st, 1932.

Division.	Sheep.		Cattle.		Horses, 1933.	Pigs, 1933.
	1933.	1932.	1933.	1932.		
	No.	No.	No.	No.	No.	No.
Central	1,615,925	1,501,929	129,658	119,807	57,750	42,534
Lower North	1,262,400	1,232,763	41,404	37,830	40,588	16,250
Upper North	961,604	1,005,608	24,669	21,029	14,459	4,453
South-Eastern	1,433,809	1,306,586	50,280	43,193	12,533	6,059
Western	1,129,085	1,052,272	17,367	14,425	27,075	8,361
Murray Mallee	609,750	558,074	36,378	30,803	32,962	13,728
Total Counties	7,012,573	6,657,232	299,756	267,087	185,367	91,385
Outside Counties	928,487	1,056,004	52,972	45,845	11,422	188
Total State	7,941,060	7,713,236	352,728	312,932	196,789	91,573
Increase	227,824	1,104,255	39,796	47,608	6,567	−22,258

LIVESTOCK WITHIN AND WITHOUT GOYDER'S LINE OF RAINFALL, 1931 TO 1933.

Year.	Sheep.		Cattle.		Horses.	
	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.
Within Goyder's Line of Rainfall.						
1931	4,221,994	63·88	189,488	71·42	134,825	72·79
1932	4,803,728	62·28	223,716	71·49	139,231	73·19
1933	5,217,669	65·70	249,387	70·70	142,490	72·41
Without Goyder's Line of Rainfall.						
1931	2,386,987	36·12	75,836	28·58	50,397	27·21
1932	2,909,508	37·72	89,216	28·51	50,991	26·81
1933	2,723,391	34·30	103,341	29·30	54,299	27·59

WOOL PRODUCTION.

Division.	Wool Clip.			Average Weight Fleece.		
	1933-34.	1932-33.	Increase.	1933-34.	1932-33.	Increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Central	13,136,261	12,105,410	1,030,851	8·04	8·21	−0·17
Lower North ..	11,002,521	10,940,916	61,605	8·71	9·46	−0·75
Upper North ..	8,927,704	8,548,250	379,454	8·69	9·07	−0·38
South-Eastern	10,796,754	10,175,592	621,162	7·58	8·07	−0·49
Western	8,874,004	8,478,574	395,430	7·73	7·97	−0·24
Murray Mallee	5,001,285	4,478,916	522,369	8·65	8·66	−0·01
Total Counties	57,738,529	54,727,658	3,010,871	8·16	8·53	−0·37
Outside Counties	9,929,753	10,426,974	497,221	9·60	9·01	0·59
Total State .	67,668,282	65,154,632	2,513,650	8·34	8·60	−0·26

Grand Total Wool Production (clip, fellmongered, and on skins exported), subject to slight revision, 1932-33, 75,727,946lbs.; 1933, 79,500,000lbs.: increase, 3,772,054lbs.

Minus sign denotes decrease.

WHEAT PRODUCTIVITY CLASSIFICATION, 1933-34.

With a view to ascertaining the extent of acreage producing very high and very low returns of wheat per acre, all wheat farms have been classified according to their productivity per acre. The accompanying return sets forth comparative details for the three seasons 1931-32, 1932-33, and 1933-34.

The total yield for 1933-34 was 35,373,466 (42,429,614) bushels, averaging 9·26 (10·43) bushels per acre, and the Agricultural Areas Rainfall, April-November, was 11·66 (14·70) inches.

Of the 13,919 (14,248) farms in the State, 7,192 (8,267), or 52 per cent. (58 per cent.) harvested yields of 9bush. and over, and 6,727 (5,981), or 48 per cent. (42 per cent.) yields of less than 9bush.; 2,649 (2,323) farmers, or 19·03 (16·30) per cent. harvested 18bush. per acre and upwards, producing 33·21 (26·38) per cent. of the crop from 13·60 (12·92) per cent. of the total area sown; 32·64 (41·72) per cent. of the farmers harvested 9bush. and under 18bush., and 48·33 (41·98) per cent. less than 9bush. per acre.

Of the 2,649 (2,323) farms with average yields of 18bush. and over, 1,182 (940) were in the Central Division, 1,067 (967) in the Lower North, and only 400 (416) in the remaining four Divisions of the State.

Of the total of 6,727 (5,981) farms under 9bush., the Murray Mallee and Western Divisions had 1,956 (2,064) and 2,116 (1,643) respectively. In these Divisions there were 733 and 519 under 3bush., 767 and 922 with 3-6bush., 456 and 675 with 6-9bush., and 388 and 511 with 9bush. and over.

During the last 10 seasons the total State acreage under wheat for grain has increased to 1,400,000, of which 1,000,000 acres have been in these two Divisions, and the effect has been to reduce the average yield for the State.

The following are the details in Divisions :—

Divisions.	Wheat Crop.		Wheat Farms with Yields of			
	Total.	Average per Acre.	Under 9 bush.	9-18 bush.	18bush. and over.	Total.
	Bush.	Bush.	No.	No.	No.	No.
Central	7,943,937	15·85	1,032	1,834	1,182	4,048
Lower North	12,689,577	14·79	705	1,379	1,067	3,151
Upper North	2,399,603	6·61	834	351	142	1,327
South-Eastern	712,988	16·14	84	126	212	422
Western	6,899,363	6·21	2,116	472	39	2,627
Murray Mallee	4,727,998	5·42	1,956	381	7	2,344
Total 1933-34	35,373,466	9·26	6,727	4,543	2,649	13,919
1932-33	42,429,614	10·43	5,981	5,944	2,323	14,248
1931-32	48,093,102	11·81	5,114	5,704	3,488	14,306
1930-31	34,871,526	8·34	7,052	5,253	1,733	14,038
1929-30	23,345,093	6·40	7,833	3,675	1,688	13,196

Average Area of Wheat Crops per Holding.—Central, 142 ; Lower North, 272 ; Upper North, 274 ; South-Eastern, 105 ; Western, 423 ; and Murray Mallee, 372 acres. Total State, 275 acres. There were 1,713 farms with less than 50 acres for wheat, and of these 771 were less than 20 acres.

Productivity of Wheat Areas—South Australia.

Comparative analysis of the Productivity of Wheat Areas per acre for the seasons 1931-32, 1932-33, and 1933-34. Total average inches rainfall in agricultural areas (with April-November totals in parentheses)—1931, 15·11 (13·27) ; 1932, 18·16 (14·70) ; 1933, 13·73 (11·66).

Production Groups.	No. of Wheat Growers.			Area of Crop.			Production.		
	1931-32	1932-33	1933-34	1931-32.	1932-33.	1933-34.	1931-32.	1932-33.	1933-34
	No.	No.	No.	Acres.	Acres.	Acres.	Bush.	Bush.	Bush.
Under 3 bush. ..	746	1,136	2,253	198,233	309,688	686,329	363,252	604,316	1,074,464
3 and under 6 ..	1,960	2,214	2,407	626,884	748,386	872,025	2,817,122	3,503,682	3,896,430
6 and under 9 ..	2,408	2,631	2,067	830,579	893,743	681,409	6,139,473	6,681,003	4,962,651
9 and under 12 .	2,131	2,213	1,672	685,958	650,945	443,304	7,102,321	6,828,834	4,567,020
12 and under 15 .	1,875	1,967	1,516	516,035	514,076	332,413	6,826,644	6,756,297	4,452,064
15 and under 18 .	1,698	1,764	1,355	409,772	424,425	286,674	6,632,745	6,859,992	4,672,551
18 and under 21 .	1,347	1,170	1,059	326,576	275,546	203,879	6,318,102	5,288,873	3,922,958
21 and under 27 .	1,557	984	1,190	357,169	224,235	241,133	8,326,212	5,147,915	5,606,850
27 and under 33 .	501	148	335	108,274	23,412	65,560	3,141,809	677,437	1,898,242
33 and up.......	83	21	65	11,890	2,326	9,069	425,422	81,265	320,230
Total under 9 ...	5,114	5,981	6,727	1,655,696	1,951,817	2,239,763	9,319,847	10,789,001	9,933,551
Per cent to total	(35·75)	(41·98)	(48·33)	(40·67)	(48·00)	(58·61)	(19·39)	(25·43)	(28·08)
Total 9 to 18 ...	5,704	5,944	4,543	1,611,765	1,589,446	1,062,391	20,561,710	20,445,123	13,691,635
Per cent to total	(39·87)	(41·72)	(32·64)	(39·59)	(39·08)	(27·79)	(42·75)	(48·19)	(38·71)
Total 18 and up .	3,488	2,323	2,649	803,909	525,519	519,641	18,211,545	11,195,490	11,748,280
Per cent to total	(24·38)	(16·30)	(19·03)	(19·74)	(12·92)	(13·60)	(37·86)	(26·38)	(33·21)
GRAND TOTAL	14,306 (100·00)	14,248 (100·00)	13,919 (100·00)	4,071,370 (100·00)	4,066,782 (100·00)	3,821 795 (100·00)	48 093,102 (100·00)	42,429,614 (100·00)	35,373,466 (100·00)

PAPERS READ AT CONFERENCES.

EYRE'S PENINSULA (WEST), CEDUNA, JULY 4th, 1934.

THE VEGETABLE GARDEN.

[By T. R. ZIPPELL, Mudamuckla.]

In preparing a garden, I prefer a piece of scrub land, as it does not require so much manure, and grows a better crop the first season. All stumps, sticks and rubbish should be burnt on the ground, and the ashes dug in. The ground should be dug with a spade 1ft. deep, and at least 1 month before the ground is wanted for planting. By leaving the ground for several weeks after digging, the air and sun sweeten the soil, and better growth is the result. A good coating of stable manure and a sprinkling of super should then be given and dug in. When levelling the surface with a rake, bank up the sides of the bed with the top of the rake, so that the plants can be given plenty of water when they are big enough.

Sow the seeds in the open; the seedlings get hardened and do not get such a check when planted out as when grown in a sheltered place. I often sow them at the end of the bed that is to be planted. In this district lettuce, cabbage, and cauliflower seeds should be sown about the end of February, when one has the water to keep them going. I have often had lettuces ready to cut by the time the first rains come, as they grow very quickly while the ground is warm. Where water has to be considered the seeds can be planted in March, and set out after the first rains. I prefer planting out turnips in the paddock on a piece of scrub land. Mix the seeds with super, and sow through the super box of the drill. Lettuces should be planted out 1ft. apart in beds wide enough for three plants. Cabbages and cauliflowers require more room, and should be planted 18in. apart. Silver beet is a good standby; it grows all the year round, and does not require very much water. Rhubarb is another good plant to grow, and once planted does not require much attention, provided it gets plenty of water. A little stable manure and super hoed into the top of beds between the plants will keep it growing. Before planting, the ground should be trenched, and plenty of stable manure put in. The first year very few stalks should be pulled to enable the plants to get well rooted. A dozen plants should keep a family going once the plants are well rooted. Apply super to the plants on an average of once a week. It should be hoed in, and the bed watered well. The hoe should be kept in use for loosening the soil and keeping the weeds in check.

Tomato seeds should be sown in July, and provided they are protected from frosts, should be ready to plant out in early September. Trench the ground, and dig out the trenches a fortnight before planting. They can then be filled in with manure with some of the surface dirt mixed in with it. Add some super as well, as it helps the plants once they start to grow. If lime is scattered around the plants when they start to flower green grubs will not attack the tomatoes when they set on the bushes.

August is the best month to sow summer vegetables. Cucumbers grow best in trenches prepared the same as for tomatoes, and along a fence; they do better if they have something to creep on. Nip off the ends of runners when they start to flower, so that the plants will set fruit quicker. Super or liquid manure should be given once a week, and bigger crops will be grown by their use. Where water has to be considered in growing cucumbers, the best method is to dig out a hole 3ft. in diameter, manured, and a kerosene tin put in the centre, with half the tin showing out of the ground. Holes should be punched in the bottom of the tin for the water to soak through into the ground. One plant

can be grown on each side of the tin. I usually put in twice as many seeds as I want plants, as all the seeds do not usually germinate, and plants can be pulled out if there are too many, or transplanted. Cucumbers and melons transplant easily if given a little attention. The apple cucumber is the best variety; it grows a big crop, and is the sweetest for eating. The long cucumbers have a tendency to go bitter. Floraphos is a good manure to use.

New Guinea butter beans are also easy to grow, provided they get plenty of water when they set fruit. I trench the ground the same as for tomatoes, and have a trellis for them to creep on.

Melons are easy to grow if given plenty of stable manure and kept watered. The Ice Cream is the variety of water melon I consider the best; the flesh keeps firm and cool, even in hot weather.

I always consider the main point in a garden is to have the ground rough dug some time before it is wanted, and when the plants are growing keep the ground well hoed and free from weeds. The application of super is also a big help; it strengthens the plants and makes them grow quicker.

SHEEP ON THE FARM.

[By A. R. MAGUIRE, Mudamuckla.]

Once a farmer has sufficient land cleared and provision made for water, he should lose no time in securing some good breeding ewes to start his flock. Buy them in the wool for preference, so that the quality and staple of wool can be judged.

If not already in lamb, choose a good Merino ram, and mate the ewes in December so that the ewes will begin lambing in May, by which time (in normal years) there should be green picking for them.

It is advisable to reserve a paddock as near the homestead as possible for the lambing ewes, so that a watch can be kept early and late. Thus a young ewe which may be having difficulty in lambing can be assisted, and it will also tend to check the ravages of the fox.

Treat lambing ewes—and, in fact, all sheep—as quietly as possible, and better results will be obtained. Confidence in the flock master will make them more contented. Do not use a sheep dog unless absolutely forced to do so.

Breeding ewes should be in good condition, but *not over-fat,* and it will be found beneficial to give them a few sheaves of hay morning and evening, scattering it about the paddock. This makes the ewe take exercise to get her food, and being so often among your sheep tends to give them confidence in you, which is one of the secrets of successful handling of sheep on the farm. If unable to keep the lambing ewes separate from the rest of the flock whilst lambing through lack of paddocks, separate them at the earliest opportunity, and tail lambs 3 to 4 weeks after dropping. See that the sheep always have plenty of water, where they can get to it whenever they wish. Provide them with either salt licks or coarse rock salt. Finely ground rock phosphate and sweet ground bone meal will be found to be of benefit, and some of these should be placed where the sheep can take what they require.

I favor the Merino for these districts. They are hardiest of all breeds, and are not so bad on the fences as some other breeds. Some people favor Corriedales, others Dorsets, Shropshires, Southdowns, and Leicesters; but for all-round Eyre's Peninsula conditions I do not think any other breed will ever replace the Merino from its position as general favorite. Do not adopt the practice of turning all the sheep on to the fallow. Keep a few sheep specially for that purpose; 15 to 20

sheep will keep a fairly large piece of fallow land very clean, provided, of course, that it is worthy of the name of fallow in the first place. By doing this there will not be so many sheep with badly sanded backs at shearing time.

Wherever possible, sheep should be dipped within 1 month of shearing; it is beneficial to the sheep and the wool, and therefore, of course, to the farmer. Crutch at least once each year to check the ravages of blowfly, and it also pays to clear any wool away from the eyes at the same time, if the sheep are heavily woolled. Do not make the mistake of having a few sheep in each pasture paddock. Give them one paddock at a time, and change them to another at intervals. Change is an important factor in sheep management.

Cull carefully; remember "only the best is good enough." It costs no more to feed a well-bred animal than a mongrel, and is much more satisfactory. In breeding for mutton for home and local consumption, either the Shropshire or Dorset Horn will be found to be a good ram to mate with either Merino or Merino-Lincoln on Comeback ewes. They impart size and quick fattening qualities to their stock, coupled with a good saleable class of wool, and are generally more prolific breeders than the pure Merino. It is true we have no satisfactory market for fat lambs on Upper Eyre's Peninsula at present, but present conditions will not always prevail.

The day is coming, in spite of pessimists, when with the extension of the Tod water mains (wherever possible), and with better water storage facilities on other farms, almost every farm will have its flock of sheep, according to its carrying capacity. Then there will always be someone wanting to buy and someone wanting to sell, and thus a market will be created for any surplus. Rail freights are against us in the matter of transport of fat lambs to the Port Lincoln Freezers, and the long, slow journey is another factor against such a scheme; but private enterprise has seen fit to provide a butter factory, which if loyally supported, may provide us with a freezing plant capable of dealing with surplus lambs for many years to come.

In conclusion, choose good class sheep of whatever breed you prefer, put them in good paddocks, surrounded by good fences; drill in oats on as much of your stubble land as you can spare; save all your cocky chaff each year, and also make a stack of straw after each harvest. Hand feed in the late summer and early winter, or until the grass has strength in it. Give them the necessary water and quiet, careful attention. Look on them as an asset, not just merely a sideline. Remember also that "half the breed is in the feed."

THE WORKING OF A FARM—1st JULY TO 30th JUNE.

[By A. C. Watson, Mudamuckla.]

Seeding completed, the first jobs should be the killing of rabbits, and fencing. Such work as new buildings, scrub clearing, and shoot cutting should be considered before fallowing, which should be started about the first week in August with a mouldboard plough. Precaution should be taken to try and prevent drift and take-all; therefore I would prefer to fallow only where the grass has been burnt or well cleared up by sheep. Do not plough in more grass and rubbish than is necessary. The old theory of turning coarse grass and straw in to keep the land in good heart is long passed; it only keeps the soil open, which induces take-all. Plough 1in. to 2in., and keep at least 2 chains from fences on the north and east sides, as most of our lifting winds come from the south-west.

Fallowing should be completed by the middle of September, and in the light soils, such as we have generally, sheep should be the only "implement" required until seeding time.

[*Papers Read at Conferences.*]

Shearing comes after fallowing. Shearing being completed, there should be a few idle weeks in which a farmer may have a few weeks' holiday, if finance permits; or such jobs as oiling harness and repairs to machinery can be attended to. An early variety of oats can be grown for hay so that, if possible, the hay can be cut and carted and stacked before the commencement of reaping.

For a harvesting plant I prefer strippers and power winnower, although a harvester would be a suitable machine to work in conjunction with strippers on farms where over 600 acres are to be harvested. All effort possible should be made to have the harvest completed by the second week in January, to give plenty of time to get ready for burning. Here we have to give a little thought to the future at this time of the year, as it may mean the difference between success and failure. First of all, a farmer should consider his financial position, and take a view of what money he can safely spare for the coming year's expenses. Is the farm paying its way? If not, I think it would be wise to endeavour to make it so by increasing or decreasing the area sown with wheat. Consider the meat and wool side of the problem, and dairying, for cutting out unnecessary wages for labour.

It is impossible to burn scrub on suitable days without the fire becoming a bad master unless there is a break of at least 5 to 10 chains on the front side. Therefore, I recommend to clear scrub where the fire will blow on to a stretch of unburnable country. New land should be ploughed as soon as possible after burning, because the sun and light rains which we are likely to have at this time of the year will help the fertility of the land.

If the soil is dry enough, commence sowing oats the second or third week in March, and follow on with new land, or clean stubbles. If the season opens in the latter part of April, be prepared to start on the fallow with a combine as soon as weeds appear, and put the land in before the soil gets too cold.

Seed and super should be sown at the rate of 50lbs. to 55lbs. per acre. I do not think it a good practice to sow wheat after the first week in June, and then finish up with an early variety. Finally, I recommend Late Gluyas and Ford for mid season, and Early Gluyas for a later sowing.

WHEATS BEST SUITED FOR THE DISTRICT.

[By C. Bergman, O'Loughlin.]

Considering the nature of the land in this district, which ranges from rather poor shallow soil to deep rich red loam, one must bear in mind the great difference between these soils. The average rainfall per year is about 13in., useful rain of about 8in., and very often less, with a dry spring. It will be seen that late wheats cannot be grown successfully under these conditions; therefore it is necessary to concentrate on mid-season and early varieties, with a preference for the latter. But it is wise to have some mid-season varieties to put in early, for it is advisable to get an early start on seeding. A dry spell is often experienced during the growing period, and if all early varieties are sown they will very likely run to head too early, and be caught by frost; hence the reason for some mid-season varieties. Wheats that were grown 15 or 16 years ago have gone right out of favour, not through climatic conditions, but mostly owing to changes in soil conditions. A few of the varieties which were very popular in those times are as follows:—Marshall's No. 3, Boomerang, Rattling Jack, Federation, Gluyas, Walter's, Marshal's Prolific, and Club Head. All these wheats, with the exception of Gluyas, have been discarded, and all are inclined to be late varieties.

When these varieties were grown with success, the soil was practically nearly all virgin ground, free from weeds, and the practice then was to sow as early as the end of February and beginning of March to catch the early rains, and by using these late varieties there was less danger of the wheat running to head prematurely. But since then things have altered considerably, owing to the prevalence of weeds and grasses, which have made the soil too dirty for early working. Farmers have been forced to alter the methods of 15 years ago by having to wait for rain to put in the bulk of the crops, which has lessened the growing period and made the use of quick growing early varieties imperative.

The most suitable and popular wheats for the district are Ford, Smut Proof, Quality, Nabawa, Joffre, Early Gluyas, Aussie, Canberra, Gluford, Gallipoli, Waratah, Late Gluyas, Sultan, and Felix. In considering these varieties—taking their good and bad points—Ford seems to hold the premier position, with other varieties running very closely. Ford is an ideal wheat; it is not so subject to red rust, and should be used more on the rich red loam soils which are likely to produce a rank growth, for these soils are more likely to encourage rust than the poorer low ground. One point a little against it is that it grows rather tall. Smut Proof is also very suitable, inasmuch as one never finds any smut in it, and it is not necessary to pickle it, which is a considerable saving. This variety should never be sown dry, the best time to sow being after the first rain. It will then stool and produce a heavy crop. It is also a very good wheat to handle. It reaps very easily, and a good sample is obtained. It is quite free from white heads, and it weighs better than any other wheat. It has a fairly high percentage of gluten, which is so necessary to keep up the standard of local wheats. Quality is very similar to Smut Proof. Nabawa is on a par with Ford, but inclined to stand up in the early growing period. Canberra is a very good wheat, but very susceptible to ball smut. It needs careful pickling, is quite a good wheat, and yields fairly heavily. Early Gluyas is a very good wheat which has stood the test of time, and is still amongst the best varieties, although it has the fault of lodging badly. It makes up for this in other directions, one of them being that it is a good yielder of even and good coloured grain. Every farmer should sow some of this variety, but do not sow too much, and reap it as soon as it is ripe. Aussie is quick growing, much quicker than Ford. It covers the ground very quickly, which enables it to choke out rubbish. It is a good yielder, but it goes down rather badly. It also has a good plump grain. Gallipoli is a heavy yielder, but is a very poor milling wheat with a low gluten content, which is detrimental to the export trade. Late Gluyas has somewhat deteriorated because of the difficulty in being able to grow a good plump grain during recent years. It is very subject to rust, and also ball smut and black rust. A number of farmers have therefore discarded this variety.

Farmers should do a little experimenting with new varieties to try them out, but not sow large quantities until they are certain that they are suitable for local conditions.

WHEAT GROWING IN COUNTY WAY.

[By J. W. BLUMSON, Laura Bay.]

The suggestion which is constantly being made to abandon wheat areas of low production has led me to review the position in County Way, where I have lived for 28 years.

County Way is about 500 miles from Adelaide, and is adjacent to Thevenard, a deep sea port, and terminus of the Port Lincoln railway (completed in 1915) and the Penong railway lines. The fishing industry employs about 100

men in the district, and a gypsum factory, now idle, is situated at Thevenard. The Mission Station, Koonibba, is in the County, and there are about 60 native children taught there.

Historical.—The first record of white men visiting South Australia was in the year 1627, when Captain Nuyts was in this district with his ship *The Golden Sea Horse.* The name "Nuyts Archipelago" was given to the islands adjacent to this district. Captain Flinders in the sloop *Investigator* was here in 1802. In November, 1840, the explorer Edward J. Eyre passed through the district on his famous overland trip to Albany. The first settlement here was a whaling station at Point Brown. In July, 1877, the telegraph line Port Augusta to Eucla, which runs through the district, was completed, a distance of 759 miles. In the late fifties most of the district was allotted as pastoral leases, and many wall shafts, house and fence ruins are relics of station enterprise. County Way was proclaimed in 1889, with an acreage of 1,670,000 (886,160 surveyed), 990,000 acres being unoccupied in 1927. The Murat Bay District Council was formed in March, 1925, and with the County of Way includes the Hundreds of Hague, Carawa, Petina, Nunyah, and Pureba. The Murat Bay Vermin District and parts of the Petina and Penong Vermin Districts are in the County of Way. On March 25th, 1882, Captain Gulloch bought the schooner *Woolomia* for the Streaky Bay and West Coast trade. The greater part of the County was covered with heavy mallee and titree scrub, and most of the scrub has been cut with an axe, at a cost averaging about 6s. an acre in 1907, 10s. in 1913, and £1 in 1927.

The rainfall is better in the southern part of the district, and averages about 12in. per annum, and the useful rain falling between April 1st and November 1st is about 9in. average for the County. Soil analysis and the use of abundance of water have shown that our soil is rich in plant food. Smoky Bay soil contains as much as 45 per cent. of lime. I believe the late Mr. W. McKenzie, was the first settler to grow wheat, in the late eighties, at Denial Bay.

The first official statistics are for the year 1890-91, when 808 acres of wheat yielded an average of 8.05 bushels per acre for the County of Way. During the following years many farmers, mostly from Yorke Peninsula, took up land, and production increased. In 1912-13 434 men were employed, and cropped 102,688 acres of the 681,856 acres leased, of which 215,403 acres were classed as cleared. Although land that has been "mullenised" and burnt is classed as cleared it cannot reasonably be compared with land without stumps.

One of the trials here is that this land will not stay cleared for cultivation; that owing to the action of the wind, the trampling of stock, and the firming of the ground dead stumps rise out of the ground and have to be dealt with repeatedly before the land is fit to cultivate. Some of the stumps are too big to plough out, and would not rot in 50 years, and until they are got rid of they cause considerable depreciation and loss and much labour.

Early settlers had to undergo hardships. They had to cart water and feed long distances, and sometimes condense salt water for stock. There were no jetties to land goods, and drays had to be driven into the sea to ship the wheat into cargo boats, and to load goods for the settler. Murat Bay jetty was built first, and in 1910-11 jetties at Smoky Bay and Denial Bay were built, and also a landing at Laura Bay. Thevenard jetty was built about 1916, at a cost of £168,528.

Water Supplies.

Excepting the soaks at Point Brown and Denial Bay, there were practically no supplies of underground water fit for stock, and consequently settlers had to build underground tanks to conserve water from surface catchments. The Government also built in 1925, tanks holding 6,888,000galls. According to the Murat Bay Council assessment of 1925, the settlers had built tanks of cement

concrete, &c., to hold 20,211,000galls., an average of 62,500 per assessment. Settlers had also spent considerable time and money sinking wells in the search for water. In spite of the provision made, many settlers have had to spend considerable time carting water.

During the past six years there have been few showers heavy enough to run water off the ground, and but little water has been caught. In July, 1928, the Tod River water scheme was completed as far as Thevenard, and has been the means of keeping many supplied with water when otherwise it would have been unobtainable. Many farmers are outside the reticulated areas, and have had a very unprofitable time water carting. When I came to the district 28 years ago a pioneer of 17 years residence told me that he had never had a failure, but every year some dry period, pest, disease or storm had reduced the yields that promised. My experience has been similar, excepting perhaps in 1916-17, when the County produced 1,399,073bush., average 14.30bush. per acre (Eyre's Peninsula was 12.90 bush. per acre), but we have not been fully paid for that wheat yet, and much of it was destroyed by mice and mismanagement.

The Railways made available only a few new holdings, but it was a benefit to many who had to cart long distances. On the other hand, some of us have to cart long distances, because our port has been closed by the railway. Wheat was loaded into overseas boats before the deep sea port was suggested, and it now costs more to send wheat from Smoky and Laura Bays to Thevenard than it used to cost to send it to Port Adelaide. Our boat service with Port Adelaide is now confined to one company, whereas in 1912 there were three companies running steamers, and freights were about half present charges.

Only a few settlers are able to receive the full benefit of the Tod River water; it is too costly to reticulate the water to our farms. Many of us have spent hundreds of pounds in catchments and tanks too good to abandon, and they have to be kept in repair. Many have not sufficient land cleared to enable them to keep enough stock to make the water supply profitable, and land clearing is very expensive. Land in this district has rarely been sold for more than a fraction of the cost of the improvements thereon. The farmers in this district have generally spent all available money on improvements, but the sale value is not an encouragement to do so. I think investigation will show that in 1913 South Australia was prospering as the result of good seasons and fair prices, and if the whole history of the State is considered, and we take the year 1912-1913 for comparison of wages, salaries, prices, &c., we err on the side of generosity. In 1912-13 there were 434 men engaged in farming here; in 1931-32, 382, a decrease of 52 men, when there were 23 tractors used. In 1912-13 they cropped 236.6 acres per man; in 1931-32 307.6 acres per man, an increase of 71 acres per man. In 1912-13 there were 2,927 horses (per man, 6.74); in 1931-32, 2,180 horses (5.70 per man). In 1912-13, 458 head of cattle, and in 1931-32 1,178 head of cattle. In 1912-13, 18,915 sheep; in 1931-32, 31,115 sheep. In 1931-32 there were 9½ acres of cleared land per sheep, and the wool clip in 1932 averaged 8.32lbs. Land cleared in 1913 was 215,403 acres, and in 1932-33 295,247 acres. Land leased in 1913 was 618,856 acres, and in 1932-33 516,867 acres. The average wheat yield for the County for 38 seasons 1890-91/1932-33 was 5.08bush. per acre. In 1912-13 an average of 30.7lbs. of artificial manure was used per acre, and in 1932-33 only 23.5lbs. per acre. In 1893-94, 1894-5, and 1895-6 statistics were not collected. The average seems low, but we find that the State yield for the 7 years 1896-97 to 1902-3 averaged a little less than 4bush. For the same period Mr. Joel Lowe, of this district, averaged slightly more than 9bush. All experts agree that we cannot grow wheat under present conditions profitably. It is true that on an average we produce enough wheat per man employed to feed more than 250 persons,

truly a performance to be proud of, but at the end of our year's work our balance-sheet shows that we have no personal gain in most cases, but depreciation and loss.

Until 1913 the County was making progress, and the State prospered. Wheat prices had averaged about 3s. 9d. per bushel since 1900, and we could meet our expenses. The settler who goes furthest from civilisation to develope land pays most for all his requirements and receives least for what he has to sell, and because of taxation being passed on he pays more than his share of taxation. I have spent a considerable time among old invoices, price-lists, and other accounts, and I declare that the expenses of wheat growing and living in this district are double what they were in 1913, and wheat is now 2s. 5d. and lower. The cause is due to the tariff, taxation, increased freight charges, and other similar charges. Merchants, manufacturers, and importers transfer the expense of taxes and Customs duties, other expenses, and bad debts, &c., to the price of his goods, and the purchaser pays. As a result, we find that, in spite of improved methods of manufacture, improved methods of transport, and low prices of metals and other commodities, we are asked twice as much for goods we require as we paid in 1913. Although some goods seem to be as cheap in price as in 1913, the quality is much inferior. I bought rabbit traps this year, paid nearly three times the 1913 price, and in more than half of them the spring has broken. We cannot pass our expenses on, and our efforts to pay expenses by increased production have only made matters worse.

Assistance to Farmers.

Much has been said about the assistance given to farmers, but if tariff charges and taxation are investigated it is found that such imposts have increased since the price of wheat was profitable. Our assessment value for land tax was increased at the end of 3 years' ruinous drought and crop failures. Our rents, rates and taxes are generally due in advance, and fines and interest are imposed for late payment. If a farmer tries to pay his way he is treated harshly if accounts are a few days late.

The replacement of plant and machinery under present conditions is a problem, and the abandonment of adjacent farms makes it difficult for survivors to cope with vermin. The settlement of abandoned farms in this district should be expedited. They depreciate in value, and should be treated like perishable goods, sold to the highest eligible bidder. If it were not for the artificial conditions created by tariffs, taxes, bounties, we would have been able to manage, in spite of the low price of wheat. Our hope of survival is to reduce costs of production, and to keep our expenditure as low as possible. We should be able to increase our average yield by better methods. Only about 8 per cent. of our acreage is on fallow at present; but we must balance the ledger to be on a sound basis.

I believe more time and money has been spent on rabbit destruction in this district this year than ever before, and, in spite of this, a lot of wheat has been destroyed, and rabbits are still a nuisance. Yet no effort is being made to settle idle blocks. On an average there were 71 acres more per man cropped in 1931-32 than the average of 1913, but the increased production does not pay owing to the increased cost of the larger machinery used, trucks, tractors, and other production costs.

Farming in this district is the extreme contrast to the unskilled worker unemployed in the city. While the unemployed man looks for years sometimes without finding work, a settler here can put in his double shifts of 8 hours before dinner and 8 hours after for a lifetime without having the satisfaction of having caught up with his work of land clearing and improvements. At the end of his career there will be a farm capable of feeding hundreds, but he will most likely have nothing else to show for his industry and self denial. When we have

good harvests and prices the extra proceeds have been spent on improving our bit of Australia, but now we cannot even keep our bit in order under present conditions.

The County of Way and adjacent counties were settled before the Advances to Settlers Act was passed, and the talk of abandoning these areas hardly merits discussion. One has only to contemplate the cost of the improvements made by settlers for which compensation amounting to millions of pounds would have to be paid to perceive the madness of the idea. These settlers have paid rent and taxes in advance from the time they applied for their holdings, and they are now carrying a heavy load of which taxation forms the bulk. They deserve special treatment because of the conditions of their life, work, and expenses, and in the past when drought prevented them from paying rents and taxes they were charged fines and interest, and their load increased. It would be more reasonable to remit Government charges when the rainfall was below, say, 9in., and it would also be just to remit motor taxation. I would like to stress the point that we have paid our rent and taxes, but have been unable to make provision for the renewal and proper repair of our plant and machinery, and we must soon acknowledge that the latter is most important.

BOOKKEEPING ON THE FARM.

[By C. HALAHAN, Ceduna, July 4th.]

I have attempted to give you a system whereby a record can be kept in the simplest way, involving a minimum of writing and records.

We all realise that any system of bookkeeping is distasteful to practically all farmers—and not only to farmers, for I have seen few people who take kindly to bookkeeping.

The system is really that of a diary, and the only book to be kept is that diary. These special books can be procured at a reasonable cost, one that will suit the requirements of most farmers costing only 3s. or 4s. ("Invicta" Australian Diary, No. 5).

The book is headed for each day in the year, three days to a page, or a week to a double page, with a money column at the side. As well as this there are pages at the back double ruled as a "Cash Account," a page for each month.

To start with, and there must always be a beginning, my suggestion is that the farmer make his financial year the same as is required for income tax purposes. It is a good thing to have uniformity, and June 30th is really a good period for a farmer to finish his year, as at that time, under reasonable conditions, he will have sold his wheat and wool, and also completed his seeding, and that period is, if any is, a slacker one for him.

The beginning will involve the compilation of a balance-sheet. This really is not difficult, but it must be honest. It is no good for a farmer to try and cheat himself, and the figures in that balance-sheet must be those of the true value of his assets and his total liabilities.

ASSETS.

I will take the *Assets* first, they are much the most pleasant to deal with.

The first of these is, of course, the farm as it stands, including improvements. This should be put down at the value that the farmer considers it is worth to him, and in later years the value can be increased or decreased, though it is wisest to settle a value which is only increased by permanent improvements, or decreased by any drastic change in the value of land in the district.

Next is the plant. Make a list of all implements separately, putting a value to each. For that value I would suggest the original price, less depreciation to date. Thus if a stripper cost £150, and the life of it will be 15 years, its annual depreciation is £10. If it has been in use five years it has depreciated £50, and its present value is £100. In this way the value of the plant can be ascertained, and the annual depreciation worked out, too. For later years the only figure to take is last year's value, plus the purchase price of any machine purchased during the year, less the amount of depreciation last year, and one year's depreciation on the new machine, if any, taken into account.

Then come the horses, and these should be valued in the same way. If Duke is 6 years and worth £28, it means that his annual depreciation is £2, as he has, say, 14 years more service. These figures are not supposed to be correct, but are used only as illustrations. In the valuing of horses though, their worth to the farmer, or the sum he could replace them for, is what should be taken into account. If Blossom is 15 years, she has only five years' work ahead, and £20 is a big value for her, compared with Duke at £28, despite how good a mare she is.

All other assets—sheep, wheat on hand, other grain, hay, motor car, cash in bank, moneys owing to the farmer, suburban blocks or township properties should be listed and valued, and that completes the assets.

Liabilities.

The first is the capital debt on the farm, if any, whether to the Advances to Settlers Department or to a private mortgagee. The total owed, capital, arrears of interest, and current interest should be shown.

Next are amounts due to the Government or local bodies. Land tax, rents, water rates, district council rates, fencing loans, &c. The total owed in each case must be shown, not only the current year's dues. Then comes amounts owing on machinery, or for 'super and bags, to be followed by the storekeepers or other local tradesmen, and any other debts that the farmer may have.

After a full list of assets and liabilities has been made, by taking the liabilities from the assets a surplus or true worth may be arrived at.

So much for the beginning, which you may say is a long one, but it is necessary for each farmer to have this record, and I would also suggest that he record a list of any property that may be on the farm, but which belongs to any other member of his family, showing to whom those things belong. This is a definite record, and a wise one to have.

It will be necessary to compile this balance-sheet at the end of each year, and a wise practice to keep a copy of it in the diary, say, on the page allotted for the last week in June, and the current entries for that period could be included with those of the previous week.

Keeping of Current Records.

I would suggest that if the diary is not written up each night it be written up once a week, as the dealings of the week can always be remembered at the end of it.

Any transaction of a day should be recorded on that day, such as "Sold to A. Butcher 20 sheep at £1." If these are paid for the amount can be entered immediately in the cash column for the month under the correct date. All sums received should be entered on these cash sheets, so that a complete record is kept of all money handled, including that for wheat and wool. The word "Paid" could also be entered against the diary note, and this shows that the transaction is closed. If only a portion is paid a note of this could be made, and so a record kept of the amount still owing.

A note of special purchases could also be kept, such as "Bought of B. Book one horse, 'Tiger,' £30 cash," or "Received 15 tons of super from Superphosphate Co.," or "Received 1 ton of iron from Builders Ltd."

For expenditure, of course, I presume that each farmer has a trading bank account, and most payments will be made by cheque. A complete record should be kept in the cheque heel thus:—Paid J. Smith £20, 1 horse, "Lofty," or paid Superphosphate Co. £30, 6 tons super, or change £10, being garage £6, parts £2, change £2. The amount of each of these cheques can be written in the cash sheet where a record should also be made of any cash expenditure from moneys received in cash and not banked, or the moneys obtained from cheques cashed.

In this way a record of the receipts and expenditure can be kept quite easily and efficiently, and also a record kept of any amounts owing to the farmer. The diary will also be found useful to keep all sorts of records, which will not only be interest, but should prove valuable for future reference.

While mentioning records I would like to say a word on statistics. In my opinion the collection of these is a vital matter to the State, and the figures they show invaluable to anyone who is making inquiries about the district.

We all know that many men do not give their correct figures, and in this way they harm not only their district but themselves. An illustration of this matter was shown here recently when the question of a butter factory was under consideration. Then it was found how very far short of the true figures were those that could be obtained from the Statistical Department with regard to the number of cows in the district.

I think that all farmers would do not only themselves, but also their district, a great service by being more careful in the statistical figures they supply.

My idea is that each farmer should keep records, not necessarily on the lines set out by me, but in some way that will give a fairly accurate statement of his affairs at any time, and one that can be followed by any person who may have a attempt to do so. The system I have shown is only a suggestion, but it appears to me to be a simple one which would not involve much labour, and would be easy to follow.

BALANCE-SHEET, JUNE 30TH.

Liabilities.	£
Advances to settlers	300
Interest to date	15
Land tax	4
District council rates	4
Vermin rates	2
Water rates	30
Fencing loan	90
Machinery	60
Storekeeper, £20; garage, £5; blacksmith, £5	30
Squatter (sheep)	50
	585
Surplus	4,255
	£4,840

Assets.	£
2,000 acres, County Way, at £1 10s. p.a.	3,000
Machinery	800
18 horses	360
200 sheep at 10s.	100
6 cows	30
50 bags seed wheat	15
100 bags oats	25
30 tons hay	60
Motor car	150
Cash in bank	300
	£4,840

[*Papers Read at Conferences.*]

Machinery.	Cost. £	Life, Years.	Depreciation, Per Annum. £	Age.	Value. £
Stripper	150	15	10	5	100
Plough	80	20	4	10	40
Wagon	140	20	7	10	70
			£21 p.a.		£210

Horses.	Value. £	Age.	Annual Depreciation. £	Value. £
Duke	28	6	2	28
Blossom	20	16	5	20
Lofty	20	10	2	20
				£68

DIARY.

July 4—Sold A. Butcher 20 sheep at £1, £10 paid, £10 paid July 9th.
Bought from B. Rook 1 horse, "Lofty," £30 cash.
Received 5 tons super from Superphosphate Co.

CASH ACCOUNT—JULY.

	Dr.	£
July	4—A. Butcher	10
	9—A. Butcher	10
	14—Wheat dividend	42
	Cr.	£
July	4—B. Rook	30
	9—Superphosphate Co.	30
	9—Change	10

CONFERENCE OF UPPER NORTH BRANCHES, WILMINGTON, JULY 18, 1934.

THE ABERDEEN-ANGUS CATTLE.—BREEDING FOR CHILLED EXPORT BEEF.

[By C. COLE, Wilmington.]

Although not so well known in South Australia as in the Eastern States, the Aberdeen-Angus breed has become more prominent of recent years.

This breed is now becoming very popular in New South Wales and Queensland, and of recent years importations of very valuable stud animals have been made from Scotland to the herds of the leading studs, to improve the breed to the highest standard possible.

Documentary evidence shows that in Aberdeenshire in 1523, and in the old territory of Angus—now forming part of Forfarshire—as early as 1863, Aberdeen-Angus formed part of the general farm stocks passing under such names as Angus Doddies and Buchan Humlies. Up until well into the 18th century the main purposes of cattle were for tilling the soil, but with the great increase in industrial population which marked a somewhat later period came a corresponding demand for meat.

Then came the evolution of the Aberdeen-Angus breed, the first and most prominent name in the list of improvers being that of Hugh Watson, "Keillor," of Forfarshire, the outstanding pioneer. William McCombie has been called the master builder, and Sir George Macpherson Grant the man who placed the coping on the Aberdeen-Angus structure.

In 1808, Hugh Watson received from his father 6 of his best and blackest cows, together with a bull, as a nucleus of an Angus Doddie herd. He then visited the Trinity Muir Market, Brechin, and secured the 10 best heifers and the best bull he could procure, showing the greatest characteristics of the breed. After the herd was in existence for over half a century, it was dispersed in 1860.

Hugh Watson's motto in his system of breeding was, "Put the best to the best, regardless of affinity or blood." Breeding in and in must be done judiciously and cautiously, for while it is the readiest path to uniformity and perfection in the hands of a thoroughly competent breeder, it is the surest and swiftest to bring destruction to the animals and interests of the incompetent breeder. To-day there is no herd in the world that is not indebted to Keillor blood, and not a few of the most noteworthy pedigrees trace back to animals bred by Hugh Watson.

Aberdeen-Angus Cow.

William McCombie, of the famed Tilly Four Herd, was formed in 1832, and dispersed in 1880. Then Sir George Macpherson Grant's Ballindalloch Herd came into prominence. This herd is still in existence, and is one of the leading herds in Scotland at the present day, but will unfortunately be dispersed in August this year.

The breed was introduced to New Zealand before Australia, the first importation into Australia being made in 1870.

The three principal beef breeds in Australia are the Aberdeen-Angus, the Shorthorn, and the Hereford. All three have good points, but each breed must be treated on its actual merits as a producer of beef that completely satisfies the demands of the London market. That the Aberdeen-Angus and its crosses satisfies this demand more fully than any other breed, there is not the shadow of doubt, and their numerous successes at fat stock shows, on the hoof, and in the carcass in Britain and other parts of the world testifies to their superior quality. Indeed, the first-class retail butcher prefers the Angus and its crosses to any other beef breed.

[*Papers Read at Conferences.*]

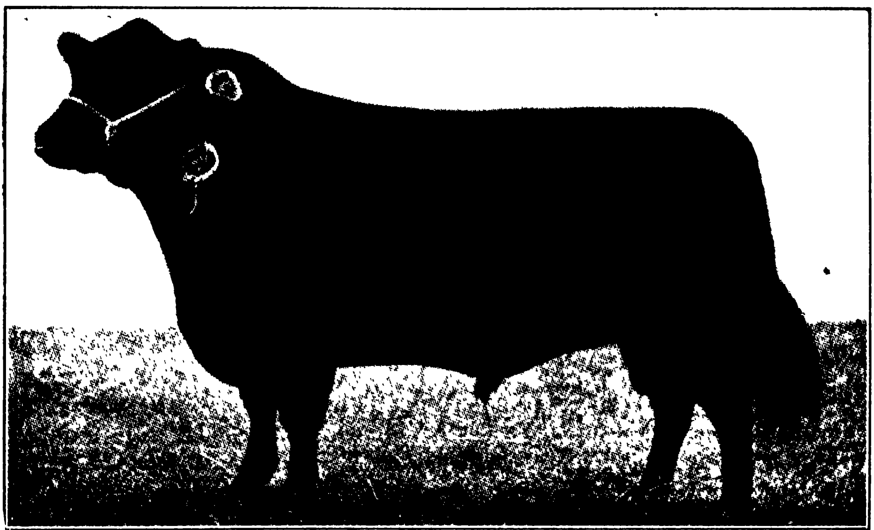
CHANGES IN EXPORT TRADE.

The Argentine had reached its peak of "cheap" production, and was encountering difficulties in meeting the ever-increasing cost of beef production.

The public's taste was changing in England, and the sale of frozen beef was becoming a difficult problem. Experiments at the time were being carried out with the "chilling" of beef for export, as it was realised that "chilled" beef would rapidly oust frozen beef from the market. The mode of living throughout the world had changed subsequent to the war. Residential flats, equipped with modern household appliances, such as freezing machines and electric cookers, were in demand. The desire for outdoor sport and enjoyment resulted in the production of the "baby car," so that home life became drastically changed.

SMALL JOINTS NOW REQUIRED.

This change in home life had a marked effect on the cattle industry. The housewife demanded a small, compact joint, to fit in the electric stove or home freezer; she wanted a lot in a little space—a short, thick roast, with little waste and small



A Typical Two-year-old Bull.

bone. The cheap or small car meant that the joint purchased was required for perhaps only one meal, as the remainder of the Sunday or holiday was spent in the country or at the seaside.

Again, in America especially, it was found that the railroad companies were keen purchasers of high quality beef, whilst in New York the demand for improved quality of beef was ever on the increase.

In Australia, however, there was no such demand, and even to-day it is found most difficult to purchase at all times a uniform quality of "modern" beef.

To be successful in any project, it is essential to have an objective in view—a standard of perfection, perhaps difficult of attainment, yet worth the trouble when the goal has been achieved. In our case the objective is the successful breeding of a steer which will be acceptable to the most discriminating buyers.

In the past, in Australia, we have grown accustomed to the big 5 to 7-year-old bullock, a beast which suited his time and purpose, and more often than not was capable of travelling long distances to the railhead, and of then being fattened to make up for loss in transit, which in some cases extended over several days.

[*Papers Read at Conferences.*]

Changed Methods Essential.

The change-over to the modern demand will not be brought about as quickly as might be hoped, for not only the breed, but also the breeder's methods, must be improved. One might be safe in saying that the change-over will go so far as to convert present sheep country into cattle country, and *vice versa.* Success in production of the modern steer will necessitate conservation of fodder, pasture improvement, and subdivision of the large runs into smaller paddocks. It may even mean in some instances a change of site for killing works, but in any case an improved means of transport will have to be provided.

However, here in Australia I would advise the average grazier to improve his 2½ to 3-year-old steers. Strive to bring them to perfection, and for the time being let the production of "baby beef" be with the stud breeder.

Watch the breeding of winning steers, and there look for early maturing strains.

Suitability of the Aberdeen-Angus.

In the Aberdeen-Angus its quick feeding and early maturing properties ensure its popularity for the commercial market. These properties find a fitting complement in the favour which is shown to cattle of the Aberdeen-Angus type by the practical men of the meat trade who have to study and cater for the tastes of the consuming public, for it is from the public that there comes the demand for the Aberdeen-Angus, the breed which yields choice quality and those juicy small joints so much in demand under prevailing domestic conditions.

Type of Carcasses for Chilling.

The progressive stages to perfection in the carriage of chilled meat from Australasia as witnessed in recent shipments, leads one to express the opinion that successful experimenting will soon give way to commercial pressure, and the near future see regular shipments of chilled beef from Australia and New Zealand to the United Kingdom.

The several factors leading up to this anticipated successful trade have been contributed by the scientist, the ship builder, and the refrigerating engineer, and it is now up to the breeder to provide the best quality meat for overseas transport in a chilled state.

The mechanical equipment on board ship is made to specification, and the engineer gets the plant that experience has dictated is the most suitable for the carriage of chilled meat. A specific quality of beef cannot be made to order, though breeders by selection of types could help greatly in this respect, and thus the engineer has no choice in the matter of texture in his chilled cargo.

Paradoxical as it may seem, fat in meat is, at the same time, a source of anxiety and a factor of safety to the refrigerating engineer He knows that fat readily absorbs the slightest odour and becomes tainted and, therefore, so far as contamination is concerned, he favours lean meat for transport. Again, he knows that lean meat provides good productive soil for the growth of moulds and bacteria, so he suggests that the lean meat be protected with a covering of fat.

He also knows that a thick covering of fat will act as an insulator and be a deterrent to refrigeration, so he recommends a thin covering of fat in order that the meat may speedily acquire a uniform temperature throughout its bulk.

Still again the engineer knows that the drying of the surface will hinder the growth of mould and bacteria, but as the surface of meat is continually fed with moisture from underlying tissues he calls for protective internal and external strata of thin, fatty tissue to arrest the leakage of moisture to and from the surface of the quarters.

With his practical experience in refrigeration and his studies in biological work, as exemplified in the points raised above, the ship's engineer—who is after all responsible for the safe transport of chilled beef to its destination—is in a

position to develop a specification for what possibly cannot be manufactured either by man or beast, viz., the desirable quarter of beef for chilling purposes in accordance with his views.

The refrigerating engineer's views are that the quarters of beef accepted for shipment should have a thin covering of fat to act as a protective surface against evaporation, mould, and bacterial growth. Further, the meat should be intersected with thin streaks of fatty tissue to arrest the flow of moisture to the surface.

These external and internal layers of fat should not be thick, as whilst they do not arrest evaporation, mould, and bacteria growth any better than the thin layers, they will hinder the refrigeration from speedily obtaining uniform flesh temperatures which is most desirable.

It is generally accepted that small-boned meat is more favoured for chilling purposes because of its lesser susceptibility to bone taint than large-boned meat.

To summarise the qualities of the ideal quarters for overseas transport in a chilled state—the beef should be preferably small boned, and should have sufficient fatty tissue properly distributed—that is, in thin layers—internally and externally to prevent evaporation and growth of micro-organisms, whilst at the same time assisting the maintenance of uniform flesh temperatures.

In the supplying of such carcasses the Aberdeen-Angus should undoubtedly play a great part, for with their minimum of bone, their characteristically "marbled" flesh, and their absence of fatty excesses, and their even cover all over, the Aberdeen-Angus seems to approximate most nearly to the ideal set forth in the professional opinion quoted above. It is, therefore, with the greatest confidence that breeders of the Aberdeen-Angus in Australia can face the future. The Aberdeen-Angus has gone far since its introduction into Australasia. When the *Triumph* sailed from New Zealand in the eighties with the first consignment of frozen meat, a great era was inaugurated; with the perfecting of a chilling process to carry meat from Australasia to Britain a still greater era has been inaugurated, and keeping in view the unrivalled place in beef production which the Aberdeen-Angus has already won throughout the world, we feel confident that with the expansion of this process will go a corresponding expansion of a breed of cattle that is so pre-eminently suitable for Australian conditions, and so firmly established in the forefront of the British meat market requirements.

Type of Animal Required.

The ordinary store cattle utilised on rough country is not the animal that will provide a carcass suitable for chilled beef trade. What is required is a well bred, compact, and well finished beast, the ideal age being from 2½-3 years. Importation of new blood would no doubt improve the quality of our beef. There are, however, good beef stocks in this country, and the essential and most important point is to use care in selecting the breeding stock. But whatever type is selected, the fattening process should begin almost as soon as the calf is born.

Dehorning.

Dehorning of cattle is an essential factor for the chilled beef trade. The bruising caused by horning each other while being driven, in cattle yards, or in the trucks results in a great deal of wastage, whereas the Aberdeen-Angus, being hornless, has a great advantage over other breeds. With the Aberdeen-Angus sire, in addition to transmitting the excellent qualities of the pure animal to its crossbred offspring, 90 per cent. of the calves of the cross will be found to be black and hornless, which is an excellent and profitable method of dehorning animals by Nature.

IMPROVED MEANS OF TRANSIT.

In the Argentine, with the co-operation of the railway companies, trains start and travel and stop without jolting. The cattle are loaded into the ends of the trains which, by letting down the ends of the trucks, are transformed into long corridors through which the animals pass prior to being finally partitioned off into their respective wagons.

ACKNOWLEDGMENT.

I wish to express appreciation of help for writing this paper from the Aberdeen-Angus Cattle Society and the New South Wales *Agricultural Gazette.*

FACTORS INFLUENCING THE FIXING OF PRICES.

[By O. KNAUERHASE, Wepowie.]

The problem of prices is an interesting one, and also very important in economics. An understanding of the principles by which prices become what they are will enable one to see why, for instance, wheat should be cheap and yet bread remain dear. There are various factors having an indirect influence upon prices, but where there is free competition they may all be reduced to the principle of supply and demand. Other factors than supply and demand are usually connected with rings, monopolies, and tariffs.

SUPPLY AND DEMAND.

It is most important that the principle of supply and demand should be grasped. It may be very simply stated thus:—When there is a big supply of a particular class of goods, but a small demand, the prices of those goods tend to go down; when there is a big demand, but a small supply, prices rise. This principle holds good no matter what kind of article is taken into consideration. Suppose a farmer has 10 fat cows to sell, but that the butcher wants only one. Here the supply is comparatively great, the demand small. The farmer may be anxious to sell. It is clear then that under those conditions the price will tend to be low. The butcher has plenty of choice, and the farmer will be willing to reduce his estimates just to get rid of his cattle. But suppose this farmer drives his 10 fat cows to market, and that there are 20 butchers all eager to purchase one. We now have an entirely different set of conditions. There is a big demand, and an inadequate supply. Prices will tend to be high. Now there are some goods the demand for which is fairly consistent, and others where the demand fluctuates considerably. This is true also of goods that are supplied. An example of an article for which the demand is fairly consistent is bread. After all, there is a very definite limit to the amount of bread one man can eat at a sitting, and so the demand for a thing like bread, a staple food and constantly required, is relatively fixed. It might be well to introduce the idea of a marginal price or limit price at this point. A very hungry man might pay 1s. or 1s. 6d. to get a loaf of bread; if he were still hungry he might pay 8d. or so for the second loaf, but he would have to be very hungry indeed before he would be willing to pay more than the ordinary price for the third loaf. In other words, as the need for an article decreases, the less a person is willing to pay in order to get it. The price of the third loaf—the one that a man might still buy, but wihch he does not really need—is called the marginal price, and in general it is found that the price of such things as bread, meat, and so on is the marginal or limit price.

Now take an example of articles for which the demand varies. Such articles are fashion goods. Every woman likes to dress according to the prevailing fashion, and this is a fact well known by the storekeeper. Consequently he asks

a high price for his new season's goods and, of course, gets it. Towards the end of the fashion season the demand has completely fallen off, and prices slump badly.

Goods of which there is a varying supply are chiefly antiques, such as rare pottery, old furniture, and also perishable goods—fruit, fish, &c. When the supply is small almost any price can be asked if there is a demand for the goods. For example, rare skins and furs, for which very high prices are paid. Wool is a good example of a commodity of which the supply is reasonably constant. The price of an article has very little relation to its actual value or worth.

Wheat.

For example, the price of wheat is 2s. a bushel; it may actually be worth a good deal more or a good deal less. The actual worth of an article is not easy to determine.

What are the general factors which determine the price of wheat? Everything depends upon supply and demand. But in the case of wheat the demand is fairly constant; the number of bushels of wheat consumed by the world in one year can be fixed within fairly definite limits.

The only way in which the demand for wheat can be increased is by using wheat for other purposes than bread, or by inducing those who now eat rice and maize to eat wheat instead. Even so, the demand would soon reach a limit. It is clear that there must be a definite limit to the amount of wheat consumed in any one year. Even if everyone ate as much bread as he could, he could not eat more than a certain amount. We must look to the supply, then, for the causes of fluctuation in the wheat price. The production of wheat is by no means steady; it depends upon weather conditions, acreage, disease, etc. It is clear that the amount of wheat produced in the world in any one year may be great or small. In the past there has been a serious over production of wheat; far more has been produced each year than can be consumed. The idea at the back of the Wheat Restriction Scheme was to restrict the amount of wheat produced each year to the same amount or a little more than that which was consumed each year. In that way the supply and demand would be about equal; prices would be fairly steady with no marked fluctuations. Of course, if there were a failure of harvest a very serious shortage would result, with very high prices for wheat as a result. Again, the only effect a war could have would be to disturb the production of wheat and the markets of the world. This might result in a diminished supply, with a consequent rise in prices. A very important point to keep in mind in regard to wheat—and, in fact, all farm products like wheat, wool, and meat— is that they are sold in the open world market. There is competition from all nations; the farmer is not in a position to fix his price, and must take the ruling price of the day. This, of course, is what happens in any market where there is free selling.

Wool and Meat.

In regard to wool the supply of the whole world is fairly constant, and would not vary much from year to year; over a period of years there may be a gradual increase or gradual decrease. It is the demand then that determines the price of wool. Here, of course, a war may play an important part, since wool is required for clothing. But apart from war the demand for woollen goods may vary. If people make large purchases of woollen goods the manufacturer may raise his prices; but he cannot go on doing that, because there comes a point when people will buy cotton goods in preference to woollen goods if the cotton goods are cheaper. Consequently there will be a slump in the woollen industry, with a drop in the price of wool. The present high price of wool is due to several factors.

Either some countries want wool for a special purpose, or the supplies at the woollen mills have run out, or there may be a demand for woollen goods, or the manufacturers may expect an increased demand. In the case of meat there is a local as well as a world market. The local demand is likely to be fairly constant. The overseas trade would vary. The price of beef or mutton, cattle and sheep, would depend on how many head were under offer. The greater the supply of choice beef the cheaper it will be for the producer.

FACTORS INFLUENCING THE PRICES OF GOODS.

Three important items are petrol, machinery, and cornsacks. In regard to these the manufacturer usually estimates the cost of the goods he produces, and then fixes his price to obtain as great a profit as he can. This, of course, may not be very high, particularly where there is competition. In the production of petrol, for example, a number of petrol magnates may form what is known as a ring or monopoly by which they agree not to sell petrol or oil below a certain price. This has been done in America, where the oil wells are controlled by one firm. Where a firm has a monopoly over any goods they may fix the price. In practice the price is usually not too high, as it pays the firm or trust to sell a great deal at a smaller profit rather than little at a high profit. Monopolies have serious disadvantages, but also many advantages.

TARIFFS.

The question of tariffs is really the question of two opposing policies, that of Free Trade and that of Protection. Every country must decide what policy it will adopt, whether it will encourage Free Trade and competition from foreign sources, or whether it will try to protect its local industry and its financial position by means of tariffs. Tariffs are imposed for three main reasons:—(1) To restore an unfavourable trade balance. (2) To protect and build up local secondary industries. (3) Prevent the dumping of foreign goods; and a fourth and important reason is to secure revenue for administrative purposes.

The problem of a trade balance between country and country is one of the most complicated in economics. Fairly simply, it is as follows:—When two countries trade with each other—say, England and Australia—it will not be long before one country will have purchased more than the other. Suppose that Australia exports £100,000 worth of wheat, &c., to England, and imports £150,000 worth of woollen goods. Then the £50,000 extra imports are considered the debt that Australia owes to England, or, as it is usually put, there is an unfavourable trade balance for Australia. It should be noted that it is impossible to pay for goods from another country by money. If, for example, a firm purchases £1,000 worth of clothing from England, the only way in which this debt can be settled between England and Australia is by sending some goods from Australia to England. In actual practice, of course, no goods are sent. Instead, the banks settle this matter. A man making a payment from Australia will go to his banker and send a bank draft. In London an account is kept showing the payments to and from Australia; a favourable or unfavourable trade balance depends whether more goods have been imported or more exported. An unfavourable trade balance is bad for a country, because that country must continually pay more for its imports than is necessary. That is why, for example, the Australian £1 note is worth only about 16s. in England. Tariffs are then imposed to encourage exports and reduce imports as much as possible. This reduces the unfavourable trade balance.

Tariffs are also imposed on imported goods to help local industry. In a young country like Australia local factories such as machine factories, woollen and paper mills, &c., could not exist if they had to compete against foreign countries. Foreign countries have old, well-established factories with the latest machinery, and can,

therefore, produce goods much cheaper than the local factories In the competition of Free Trade the local industry would be killed. It has been found an advantage in a new country like Australia to protect secondary industries. These industries provide much employment, and this in return supplies a local market for meat, wheat, butter, eggs, &c. It has often been said that the city could not exist without the country, but it is equally true that the country would be in a very bad way were it not for the thickly populated cities and the markets for farm produce that result therefrom.

The third reason for imposing tariffs is to avoid the dumping of foreign goods. It has happened that a monopoly, for example, has shipped its surplus goods to a foreign country and there sold them at less than cost price. This process is known as dumping, and it is easy to see how such a thing could ruin a local industry. Consider what would happen if a foreign country dumped its surplus wheat in Australia. There would not be much left of our farming industry.

Free Trade would, of course, make many things cheaper, for example, sugar, tobacco, cornsacks, tractors, machinery, petrol, &c.. and would seem at first sight to be of value, especially to the farming community. But that may not be the case. It may give cheaper implements but ruin the markets for our products. If the factories had to close the prices of such things as eggs, butter, meat, fruit, vegetables, sugar cane, &c., would immediately slump.

The effects of a tariff may be given as the following:—Local industry is preserved and so markets for farm produce, increased employment, revenue for the Government, which all help to pay, foreign goods are kept out. The disadvantages are:—Local goods, for example, go up to the price of the imported article, the local article may be inferior to the foreign one, by restricting imports from other countries we also lessen our markets abroad. Examples of this are barley in Belgium, and quite recently our markets in Fiji, because Australia has placed too high a tariff on Fiji bananas. Tariffs cause prices to rise, since the dealer will always pass on the tax if he can to the consumer. Tariffs have advantages as well as disadvantages, and a country like Australia would be wise to retain some tariffs at least.

OBSERVANCE OF PRACTICAL FARMING.

[By J. G. Schuppan, Wilmington.]

Much can be said in the direction of practical farming, and experiments and observations have now led me to believe that farming in the Northern areas is only a gamble which depends more on luck that direct practical work.

I have seen poor crops on well-worked fallow, and also good crops on poorly-worked land It is important for the man on the land to study the climatic conditions and character of soils which vary considerably in one district. The working that would prove a success on one soil is likely to fail on another farm.

Climatic Conditions.—My experience has proved that where there is a rainfall of under 8in. per year fallow should not be worked in spring, but any weeds that make an appearance kept down with sheep. This, with an additional working before seeding gives best results. If the rainfall is above 8in. per year I advocate working the land in spring, providing conditions are favourable. It is a well-known fact that just as much harm can be done to some soil by over working as under working.

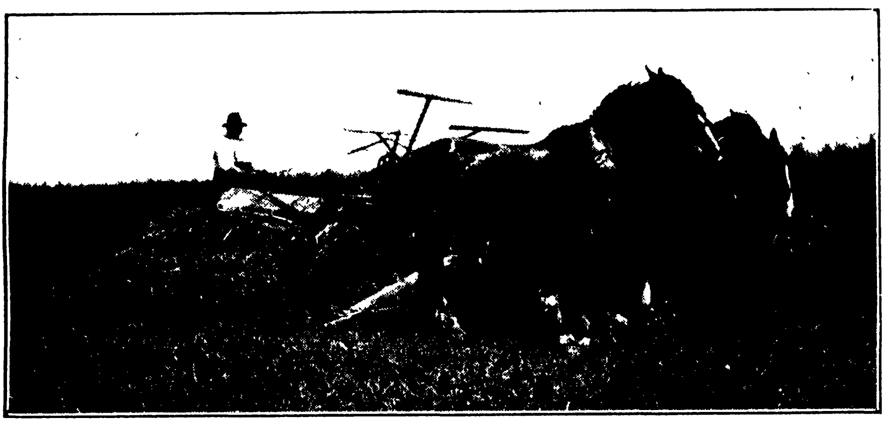
I have always been a believer in proper cultivation, and for this reason. In 1923, with 15in. of rain in that season, 500 acres were fallowed of which 50 acres remained uncultivated. The land was sown in 1924, during which year

[*Papers Read at Conferences.*]

12½ins. of rain fell. The yield on 450 acres was from 15bush. to 18bush.; the 50 acres not cultivated in spring received an extra cultivation at seeding and yielded 24bush, showing a difference of 6bush. to the latter method.

I tried further experiments. One field of 100 acres ploughed in 1924 on 12½in. of rain was given eight different workings; ploughing 5in. deep and harrowed soon after, cultivated twice in spring with a tine cultivator, again worked in February with a disc, cultivated, drilled, and harrowed at the end of April and beginning of May. This turned out a great disappointment, only yielding a 9bush. crop. The rest of the fallow, which received five workings, returned from 12bush. to 15bush. This led me to believe that the soil was overworked and became waterlogged. As these figures are taken from a fair rainfall for our district, I would also refer to a low rainfall, for most of us think that we can conserve moisture by spring cultivation no matter how low the rainfall.

Referring to 1927:—Four fields of fallow land were sown at the same time with the same variety of wheat and amount of super. No 1 field of 100 acres was ploughed in June and July, harrowed and cultivated in September, 1926, on



an 8.03in. rainfall, and returned 9bush. No. 2 field was fallowed in August, and not worked until seeding, weeds being kept down with sheep, and it returned 12bush.

The same season 15 acres in a rather dry condition were fallowed with a tine cultivator, and 90 acres ploughed after rain. In 1928 both plots were put in dry. The rain for that year was 6.58in. Results:—15 acres shallow worked gave 3bush. per acre; 90 acres of well ploughed fallow returned ½bush. to the acre. Following these figures will prove that very little can be done so far as conserving moisture with a rainfall below 8in. is concerned, especially with a run of bad seasons following.

Referring back to 1894, with a rainfall of 15.45in., of which 4.74in. fell in December. In such a case it is apparent that moisture was carried forward to 1895, when the rainfall was 8.39in., and the growing period from April-November received 7.58in., giving a return of 7bush. to the acre, while 1896, also with 8.07in. of rain, only produced ½bush. to the acre; 1902, also with 8.98in. of rain—6.83 falling during the growing period—produced 7bush.; 1914, with 8.59in., of which the growing period only received 4.56in., returned nil.

These figures show plainly that it takes about 7in. of rain to produce about 7bush. of wheat, providing that dry seasons do not follow too closely on one another.

[*Papers Read at Conferences.*]

Crop Competitions.

Much credit is due both to the Departmental Instructors, as well as the competitors, yet it appears to me, following the figures quoted, that the Instructors have overlooked various important points; that is, to give every man an equal chance under the present system is impossible, because different localities in one district would receive probably 2in. more rain annually. Figures prove that with an additional 10in. of rain more could be done, both from a production point of view as well as for the destruction of weeds. If rainfall was taken more into consideration it would give the instructors a little more work so far as judging was concerned, but the difference in crops taken into comparison would not be so great as at present. More interest would be taken by all farmers because the competitions now interest only a few in a sure rainfall locality.

FARMING AS A BUSINESS PROPOSITION.

[By S. McCallum, Willowie.]

Farming has been one of the most important industries throughout the whole world for practically all time. But it is only of recent years that it has become a business proposition. In years gone by the farmer went out and tilled his land, sowed the grain, and harvested it by primitive, crude methods which involved very little or no expense. To-day farming is quite a different work; unless a farmer has capital to invest in various classes of implements and farming tools it is practically useless to try and win success. Thus we see that it becomes necessary to invest a large amount of capital in the farm. This makes farming a business proposition.

In this paper I wish to compare the business of farming with that of money invested in the trading banks or bonds. Suppose we have two young men with £1,500 of capital. One decides to invest his money in the bank as his business proposition. He receives a return of 3 per cent. per annum for it. While this money is earning interest for him he is employed and receives the standard living wage which under ordinary circumstances is sufficient to provide for his home requirements and pay all expenses. Thus it is not necessary for him to draw the annual interest on his investment year by year. Through the advantage of compound interest at the end of 23 years his money has doubled itself, making £3,000 in the place of £1,500 originally invested. The money he invested in the bank is therefore a sound and safe business proposition, and he goes on increasing in wealth as the years roll by.

The other young man invests his money in a farm and farming plant. Approximately he pays £500 for plant, and the balance of £1,000 is paid as a deposit on the purchase price of his farm. Suppose he buys 1,000 acres at £2 per acre. This leaves a mortgage of £1,000 on the land, and he is responsible for the interest thereon year by year, and although the depositor only receives 3 per cent. for his money the borrower pays 5 per cent. per annum. If his business proposition is safe and sound, as that of his companion's, he should not only gain £1,500 in the 23 years, but he should receive an equivalent to wages both for himself and his family. Then, too, he must invest further capital in the purchase of seed wheat, super, working expenses, and other necessary improvements, such as fencing, &c. This money must also return a bank rate of interest yearly to place him on a level with his companion.

Rates and Taxes.

He is called upon by the Government to pay tribute to a much larger degree. The ordinary worker has the means of travel provided for him by means of train, tram, and bus, and he pays a very small fee to travel thereby. The farmer

has to provide his own car to travel with, then he is called upon to pay on an average £8 per year to register it before he can legally go out on the roads. He has also to pay 10s. per year to have a licence to drive his car. These two items alone amount to nearly 3s. 6d. per week; then he has the expense of petrol on which he pays a tax; he buys oil, and has all the unavoidable expenses of wear and tear. His land also has a tax placed upon it; he has to pay land tax, district council rates, and if he is adjoining a water main—though he may have an abundance of water without it—he is rated for water which amounts to £16 13s. 4d. or more.

In the event of a drought or failure of return he is forced to draw upon his reserves. If under circumstances such as we are passing through today, year after year he is forced to do so. This is bad business, but even worse is the fact that immediately he receives an income—though he may have lost thousands of pounds previously—he is forced to pay an income tax. This is not right, and it places him under a heavy penalty compared with his fellow investor.

To-day farming as a business proposition is a complete failure, and many a farmer who invested his money in the farming industry has been completely ruined, while his companion who invested in the bank or bonds has been steadily increasing in wealth. All interest paid to investors must be paid from the return received from products. Otherwise we are robbing one investor to pay another's interest. This has been going on in the farming industry for years, with the result that instead of the farmer increasing his capital as the years roll by in a similar manner to the city investor, he has been gradually paying out his original capital. Is it any wonder, then, that the farmer is growing desperate and despondent? Realising the enormous losses that farmers have experienced during recent years, they know full well that it is impossible for their sons to launch out upon the land until some great change takes place. Our young men are very discouraged and disappointed, but most of them are working on, hand in hand with their parents, bravely carrying on what seems at present a fated industry.

Women on the Farm.

Still more noble and courageous is the spirit of our womenfolk; not only are they keeping the home together by their faithful toil and rigid economy, but they are working overtime milking cows, attending to fowls and various other duties which a farm provides. All they expect to get is enough to provide food and clothing for their families. Finally, let me warn our young men who have capital to invest to consider well before taking a venture, and beware of farming as a business proposition. For it is in reality, under present conditions, nothing but a losing business proposition. Let us as farmers be awake to our great disabilities, and, although we must continue to preserve and carry the industry through these adverse and severe conditions, keep a keen watch on those who are day by day seeking to draw out the very lifeblood of the farmer, and we shall eventually prevail against them.

IMPROVING THE STANDARD SAMPLE OF SOUTH AUSTRALIAN WHEAT.

[By E. H. Hampel, Wilmington.]

The matter of the standard sample of f.a.q. wheat in South Australia is one that should be the concern of every wheatgrower. There has been a steady deterioration in the standard during the past few years which has resulted in some depreciation in the regard in which South Australian wheat is held by overseas' buyers, and consequently a corresponding decline in its relative value.

[*Papers Read at Conferences.*]

Recently as much as 1s. per quarter (1½d. per bushel) more has been secured for Western Australian wheat in the London market than could be obtained for South Australian shipments in a similar position. This was due to the superior quality of the Western Australian sample of grain, which has been consistently good during the past few years.

The following schedule shows the weights of the respective standard samples of the various States since 1924-25; it will be observed that the Western Australian sample has been most consistent, and this feature is no doubt responsible in a large measure for the high reputation it has earned with the British and Continental millers:—

Season.	N.S.W. Lbs.	Vic. Lbs.	S.A. Lbs.	W.A. Lbs.
1924-25	60¼	60½	62	62½
1925-26	62¼	62½	61½	62
1926-27	61¼	61½	61	61¾
1927-28	60¼	61¾	62	61½
1928-29	63	61¾	62	61½
1929-30	61¾	62	60½	62½
1930-31	59½*	58½	60	62½
1931-32	61½*	62¾	61½	61¾
1932-33	61¼	62	60	62
1933-34	59*	60	60	61½

*During seasons 1930-31, 1931-32, and 1933-34 in New South Wales special second quality standards were struck at 56½lbs., 58lbs., and 55lbs. respectively, such standards being necessary to cover quantities of wheat damaged by rain at harvest time.

While climatic conditions without doubt affect to a great extent the season's sample, it is also indisputable that the growers themselves cannot be freed from responsibility. Year by year the quality of the standard sample suffers materially owing to the presence of smut-affected wheat and foreign matter, such as smut ball, barley, oats, star thistle, mallee leaf, &c., much, if not all, of which is within the power of farmers to exercise some measure of control.

The unfortunate part of the matter is that the presence of inferior wheat or foreign matter in the sample has the effect of reducing the value of the whole of the wheat in the State, so that the farmer who produces a good, clean sample carries part of the loss incurred by the less careful grower.

One of the most serious defects in the South Australian sample is the presence of star thistle. This is particularly obnoxious to flour millers, who will not accept wheat affected with it on account of the extreme difficulty in removing it. It is not susceptible to the usual methods of wheat cleaning, and the millers' machinery will not remove it. Farmers should take particular pains to keep their land free from this weed.

Smut affected wheat and smut ball also have a detrimental effect on the standard quality. Effective pickling of seed is essential if this disability is to be lessened.

Farmers whose wheat is inferior frequently are of opinion that the dockages imposed by wheat buyers are excessive, and represent more than the difference between their particular sample and one of fair average quality. In this regard it must be remembered that the buyer must make provision for the additional costs of handling, as well as for the inferior quality of the wheat. When inferior wheat is found amongst the contents of a truck at a mill or at ship's side it becomes necessary to handle it several times, and each handling costs money. First, it must be reloaded into a truck or trolly, then carted to a store, unloaded, stacked, and eventually unstacked, loaded to trollies, and carted to the ultimate buyer. By this time it is possible that the costs have been increased by anything up to 3d. a bushel, which amount must be added to the loss in value, due to inferior quality.

[*Papers Read at Conferences.*]

Grading.

It is considered by some that the difficulty regarding the standard sample could be overcome if the wheat were graded before shipment. It is most doubtful whether the benefits which would accrue from the introduction of a thorough system of grading Australian wheat would compensate for the cost of installation and maintenance. In any case such a system could only be operated as a part of a complete system of bulk handling, but it is significant that grading machinery installed in conjunction with some of the country wheat silos in New South Wales is not used.

The grading system in vogue in the United States of America and Canada is very complicated, and hundreds of differing grades of wheat are produced. There is a marked difference in value between the higher and lower grades, and as relatively little of the wheat as a rule reaches one of the high grades the advantage gained may not be as great as would at first appear. The various grades are fixed according to certain defined milling qualities, such as moisture and gluten content, &c., the different classes of grain are kept separate. A thorough system of grading requires a great deal more to be done than the mere elimination of inferior grain and foreign matter. No adequate comparison can be made between North American and Australian conditions because of the difference in climate and other factors.

A trial shipment of cleaned wheat was made by the South Australian Co-operative Wheat Pools Limited in 1933 in order to establish whether it would be a practical proposition to ship wheat thus treated. The experiment showed that, apart from the cost of treating the wheat and additional handlings, which was quite considerable, the additional value the wheat acquired did not compensate for the loss in weight and the reduced value of the screenings and waste matter which resulted from the process. The final result was a loss equivalent to ½d. a bushel on the quantity treated, apart from the additional cost previously mentioned.

If cleaning is to be done it could probably be most economically performed on the farms, where there would be an outlet for the screenings, and extra handling reduced to a minimum and some cost avoided. It still remains doubtful, however, even if the work was done on the farms, whether the result to the individual farmer would be worth the effort, although, if delivery of thoroughly clean wheat were to become general, there would be a distinct improvement in the standard sample, which would doubtless be reflected in the relative value overseas.

Because of the lack of incentive, farmers do not utilise to the best advantage the engineering skill used in the construction of Australian harvesting machinery. Because of the excellence of this machinery it is believed—after allowing for difficulties inseparable from field work—that the grain can be so "dressed" or cleaned that no more than 1 per cent. of screenings or other unmillable material need be left in it. The f.a.q. standard allows for nearly four times this amount, and in consequence many farmers now cover up or remove the tailing screens from their harvesters, whilst the more unscrupulous ones allow them to become choked, and thus deliberately lower the commercial value of our main agricultural product by including a much larger percentage of unmillable material.

The most obvious avenue for the improvement of the South Australian wheat standard lies in more careful farming, particularly as regards selection and preparation of seed to prevent smut and other diseases, and efficient cultivation to eliminate weeds and foreign growths.

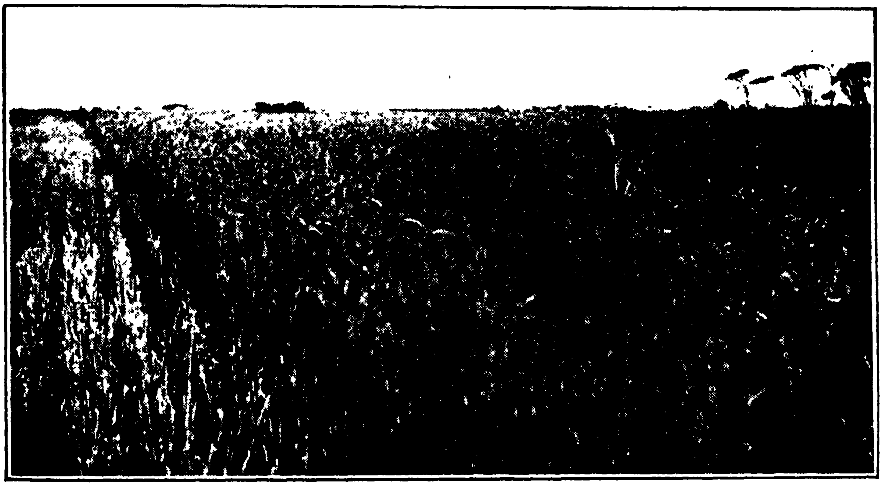
Milling Qualities.

There are, however, other avenues which must be followed if the general standard of Australian wheat is to be improved. In particular, it is essential that more attention should be paid to the milling and baking qualities of the wheat. In the

past scientific investigation in Australia has been principally in the direction of increasing the yield per acre, without paying much regard to the quality of the grain produced, or whether it was suitable for bread-making or of the quality particularly required by overseas buyers. South Australia is fortunate in having as Minister of Agriculture the Hon. A. P. Blesing, one who brings to the position a practical knowledge of farming. The improvement of the wheat standard has had the particular attention of the Minister, who has made frequent public reference to the need for improvement, and he is very keen to discover every practical means of attaining this objective.

The Principal of the Roseworthy Agricultural College (Dr. A. R. Callaghan) is paying particular attention to this factor in planning the crossing experiments conducted at the College. In a recent report Dr. Callaghan stated that the main objectives in planning the crosses were, in order of importance:—

1. Improvement in the baking quality of commercial Australian wheats.
2. Increasing disease resistance of commercial varieties, thereby increasing yield.



A Crop of Sword Wheat.

3. Breeding for short, strong straw.
4. Breeding for improved holding capacities in varieties which show a tendency to shatter.
5. To increase size and fulness of head and fill sterile spikelets.
6. Breeding for drought resistance.

The Department of Agriculture has been giving the matter of improved milling wheat close attention, and in the January number of the *Journal of Agriculture* an interesting article appeared, which referred to a report by Mr. S. R. Cowley, who personally investigated trade conditions in the Orient. Mr. Cowley found that the flour trade to Japan, China, the Dutch Indies, and other places in the East was becoming increasingly confined to Eastern Canada and the United States of America, particularly the former. The reason was found to be the superior quality of the North American flour for baking purposes, as compared with the Australian article; and this superior quality outweighed any price advantage there might have been in favour of Australian.

[Papers Read at Conferences.]

One of the principal complaints regarding Australian wheat and flour was that it lacked uniformity, whereas the quality and content of gluten, moisture content, and colour of the North American products were consistent. After seeing practical tests and thoroughly investigating local conditions, Mr. Cowley came to the conclusion that Eastern buyers would never be prepared to accept wheat or flour of irregular and unstandardised quality. Under the present f.a.q. system in Australia, where grain of many different qualities is mixed indiscriminately, it is impossible for sellers to guarantee any particular standard. Mr. Cowley emphasised the fact that a high gluten content was not essential to secure favour with Eastern buyers, but a uniform content was indispenable.

It is pointed out in the article that good milling wheats generally yield lower crops than the poorer types of milling wheat; consequently wheat continues to be grown in Australia for its capacity to yield bushels per acre rather than for its suitability for bread-making. This was likely to continue until a higher price could be secured by farmers for wheat of superior milling quality.

The article concludes thus:—"Much of the trade in flour in New Zealand lost by Australia to Canada has been due to the lack of uniformity in the quality of the shipments. As a result of this lack of uniformity, New Zealand bakers turned their attention to Canadian wheat. The result has been that New Zealand bakers and millers will not easily, even for price, revert to their former large use of Australian wheat and flour until such time that Australia can deliver more uniform quality. In addition to this, New Zealand, through its research scheme, has eliminated, through the control of the field officers of the Agricultural Department, many wheats which were unsuitable for bread-making, though prolific yielders of bushels per acre. Wheatgrowers have happily co-ordinated with the millers and bakers, and, with the aid of the Canadian cerealist engaged under the Wheat Research Institute, millers have been able to devise methods of controlling their grists, which give greater standardisation."

The method of arriving at the standard sample of wheat in South Australia each year may not be known to all farmers. It is customary early in each January for the Grain Trade Section of the Chamber of Commerce to ask the principal wheat handling firms to secure from their various agencies throughout the country representative samples of the wheat in the respective stacks. It is understood that the samples shall be a fair average of the wheat received; consequently they will include a proportion of smut-affected and light-weight wheat, foreign matter, etc. The whole of the samples received, numbering several hundreds, are thoroughly mixed together, and the resultant mixture represents the standard sample for the season. A bushel measure is filled with this wheat and weighed, and that weight declared to be the standard weight for the season. The weight for the 1933-34 season so established was 60lbs. to the bushel measure. It is important to recognise that the weight of the standard sample has nothing to do with the weight of wheat which represents a bushel for buying and selling purposes. This is always 60lbs., but the standard fixed by the Chamber of Commerce each year is for the purpose of establishing quality only.

It is well for farmers to remember that if they deliver wheat of inferior quality it is possible that it will find its way into the State standard sample, and thus be the means of assisting to reduce the standard by which the whole of the wheat in the State is sold.

The Chamber of Commerce issues samples of the season's wheat in sealed bags of various sizes. These are despatched to all parts of the world, where they are examined by prospective wheat buyers, who thus are able to form their own opinions as to the value of the wheat from South Australia. Every sale of that season's wheat whether at home or overseas—must conform to the official standard.

If it differs in any respect it may be subject to a dockage, which must be borne by the sellers. Most dockages on overseas sales are settled by special arbitrators at the Baltic Exchange in London. Dockage on a cargo of wheat may run into as much as £500 to £1,000, or even more.

South Australian millers are equally anxious to secure wheat with better milling qualities as are those in other countries, and a comprehensive study of the question was contributed to the *Journal of Agriculture* by Mr. G. L. Chinner, a miller, of Loxton, and appeared in the issue of November, 1933. Mr. Chinner emphasised the necessity for a consistent gluten content, and hinted that South Australian millers may be prepared to offer some premium for wheat of the desired quality; this would, without doubt, encourage its production by farmers. Mr. Chinner's conclusions were generally along the same lines as those of Mr. Cowley, referred to elsewhere in this paper.

This is an era of intense competition, and the future of the wheatgrowing industry in Australia appears far from satisfactory. It certainly appears that for some years to come there will be fierce rivalry amongst the various wheat exporting countries for the limited trade to Europe and other importing countries. It is obvious that when selling competition is keen quality will be of paramount importance, and the time may not be far distant when wheat of inferior quality will be not merely subject to a decreased value, but quite unsaleable. Farmers will be doing well, both individually and collectively, if they extend every effort towards improving the quality of the grain they produce, for it is a matter of national importance.

HANDLING AND CARE OF A SMALL FLOCK, ETC.

[By G. FRAZER, Wilmington.]

It should be understood that this paper is to assist the beginner, and not the man of wide experience, although perhaps some others older than the young farmer or grazier of to-day may receive a little interest also. First, it is presumed that the young man has a farm or grazing block which is well fenced, preferably with netting.

PURCHASING EWES.

The breeder first needs a flock of Merino ewes—an even line, with sound mouths—from a station or a well-known breeder. Buying 2-toothed ewes is a gamble, as a rule, excepting during a drought year, when some people may have to dispose of their young ewes.

Buy ewes with plain bodies, as large-framed as possible. Avoid ewes with folds over the tail and in the crutch, and do not have too much leather on the neck, nor too heavy a flank.

PURCHASING SIRES.

If you can obtain a good line, and the property is well watered with wells or dams, next purchase or hire some good sires and mate to these ewes. This is very important, and for the sake of £1 or 10s. a good sire should not be overlooked. The next step is to mate the ewes at a suitable time, so that they lamb while there is a picking of green feed for the lambs. Sometimes early lambs are the best; sometimes late lambs. Taking an average over many years, May is one of the best months in the writer's opinion.

When mating rams, always clear the wool away from the horns, and swab with fairly strong dip to prevent fly-blow. Crutch all ewes about a month to two weeks before lambing.

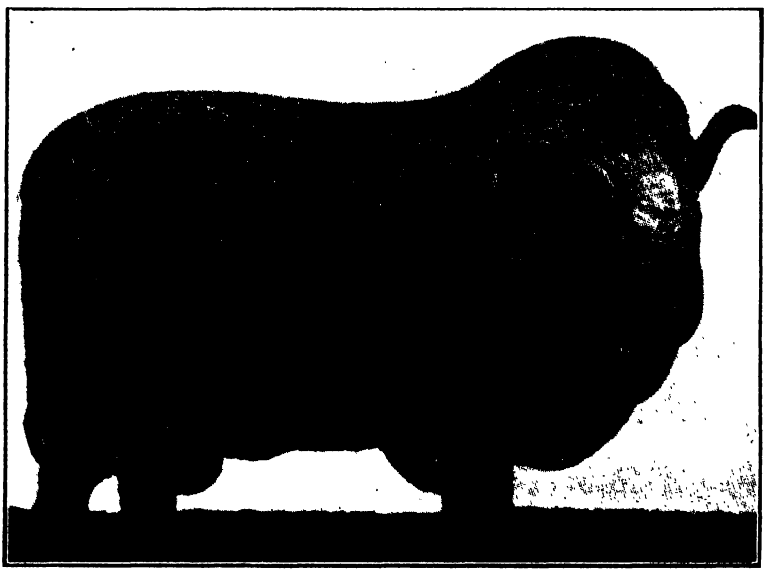
[*Papers Read at Conferences.*]

LAMBING.

When the ewes start lambing watch for flies; they are a terrible pest during lambing. If a ewe goes down on her side or back overnight lift her up until she can balance on all legs. Crows and hawks are troublesome at lambing time. Rabbit traps are very useful for catching either. Foxes are the greatest enemy of the flockmaser. It may not be that foxes kill so many lambs, but they frighten a number of lambs away from the mothers, especially young ewes.

Tail all lambs with a knife, not with a searing iron, and yard the ewes and lambs for marking the night before. When shifting ewes and lambs from one paddock to another do not force them through a gate; start a few, and let them draw through on their own. Many practical sheepmen advise pulling out the wires in a fence for a couple of panels and allow them go through that opening on their own accord.

If possible, do not permit the rams to run with the flock all the year; put them in a small paddock by themselves and hand-feed them. Sires should be cared for during the whole year, not only during mating time.



A Typical Merino Ram.

When the ewes are 1½ years old have them classed, preferably by the breeder from whom the rams were purchased, providing the sires have turned out satisfactory. If classing them yourself dispose of ewes with cow hocks, open backs, clear legs and face—these generally carry a light type of wool—wrinkly around the tail or crutch, those with very narrow shoulders, wool blind, and any with very small frames; and try and have in mind one type, and aim to produce it. Each year should see an improvement, providing you keep to the one type of sire from the same breeder.

Always have drafting yards running uphill, if possible. Yards running to the shed for shearing should, if possible, run uphill. If sheep are hard to get into the woolshed, catch a sheep and tie it up in the shed with a little rope; the rest will generally go in easily.

I have fed with success wheaten hay, barley, oats, baled lucerne and Meggitt's meal, but all are expensive if they have to be continued for any length of time.

Baled lucerne is one of the best fodders for young lambs in particular. Dry sheep may be fed on any of the above foods, but it is a different question regarding lambing ewes when it comes to making milk. This is our greatest drawback.

After shearing dipping should be done; if not for lice or tick in your flock it will help the sheep against lousy or ticky sheep belonging to someone else.

When weaning lambs put them in a paddock that has a dam of water, rather than a trough at a well. Lambs never like drinking out of troughs; also use paddock with the least grass seeds.

One often notices how roughly some sheep are handled. In sale yards some men catch a sheep by the leg and turn it over on the ground. The only time I would advise catching a sheep this way is when it is fly-blown; catch it any way so long as it is freed from this pest. Otherwise, catch a sheep around the neck and sit it down comfortably; if possible, not on the ground, but on a bag. This makes a protection from dust in the wool. Do not catch sheep out in the paddock except fly-blown; it makes them wild, and the quieter they are the better they thrive.

A Few Don'ts.

Don't use sharp sticks; cover them with a bit of bag.

Don't have half a dozen dogs in the yard; one dog can do the work much quieter and better.

Don't use sires from a breeder whose rams have proved unsatisfactory.

Don't rush sheep through a dip; let them go through steadily, and, if possible, dry under cover.

Don't rush sheep from the back of the yard; work against the way they are going.

Don't hang sheepskins over a rail; peg them out on a floor. This keeps out all the edges, and they dry better and quicker.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on August 29th, there being present Messrs. A. J. Cooke (Chairman), A. M. Dawkins, J. W. Sandford, F. Coleman, P. J. Baily, H. N. Wicks, A. L. McEwin, A. J. Koch, Professor A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary). An apology was received from Mr. J. B. Murdoch.

Appointment of Chairman.—In view of the services which he had rendered to the Board, Mr. Cooke was unanimously requested to continue as Chairman until the question of his resignation could be further considered. Mr. Cooke agreed.

New Branch.—Conditional approval was given to the formation of a Women's Branch at Boor's Plains, with 17 foundation members.

Branches to be Closed.—It was decided to close the Tailem Bend and Kimba Branches.

Life Membership.—On the proposal of Mr. Wicks, seconded by Mr. Sandford, it was decided that Mr. W. L. Summers should be presented with a special Life Membership Certificate of the Agricultural Bureau, and that the presentation would be made at the Annual Congress.

Life Membership Certificates were also granted to Messrs. J. Kakoschke and J. H. Jericho (Lameroo), S. C. Billinghurst (Minnipa), J. Pope and N. Grace (Watervale), and C. Halliday (Morchard).

Delegates' Attendance at Congress.—It was decided that each delegate appointed to represent his Branch at Congress must attend at least 50 per cent. of the number of sessions otherwise he would be called upon to refund the amount of his fare to Adelaide.

New Members.—The following names were added to the rolls of existing Branches:—Kilkerran—A. Sawade; Tantanoola Women's—Mrs. W. Stafford, Mrs. W. Pycroft; Wilkawatt Women's—Mesdames W. Eime, A. Sumsion, W. R. Neville, E. W. Brooker, P. Gregurke, A. W. Bates; Milang—K. Turvey; Minnipa—W. J. Black, W. Crowther, J. Barnes, H. E. Broad; Narridy—J. W. Eagle; Morchard Women's—Mrs. R. F Brown, Mrs. W. Martin, Miss Joyce Martin; Alawoona—W. Watts, R. M. Koch, A. Pengilly, jun.; Koonunga—C. Bartsch, A. H. Falkenberg; Macclesfield—Alex. Read, A. Lane, Alex. Smith; Brinkley—E. A. Jones; Gladstone—E. E. Clothier, J. L. Potter, H. M. Wehr; Millicent Women's—Miss T. M. Thompson; Taragoro—L. Rudland, D. Crabb; Rendelsham Women's—Mrs. C. Stratford; Petina—A. E. Daniels, M. G. Prescott; Yurgo—A. G. L. Bampton, E. Kelly; Lenswood and Forest Range—S. Filsell, M. Mason, H. Jones; Barmera—R. M. Simes, C. T. Leaney, E. Crocker, S. A. W. Farmer, H. O. W. Short, H. Jeffries, G. Manning, R. H. Davidson, L. de Fontenay, G. Jones; Buchanan—E. N. Rohde; Clare Women's—Mesdames M. Phyllis, C. Gordon, G. Coles; Penwortham—P. Modystach, J. Chynoweth; Pinnaroo—C. H. B. Ross, A. E. Ross; Kalangadoo—D. Cowell, T. K. Hemmings, C. E. Leader; Mypolonga—A. E. Milde, H. E. Daenke; Appila—C. Bottrall; Narridy—J. M. Smith; Greenock—E. R. Radford, E. J. Helbig; Gladstone Women's—Mrs. E. E. Clothier, Miss Milligan, Mrs. Pearce, Mrs. T. Ballantyne, Miss J. Ballantyne, Mrs. W. Ballantyne, Mrs. Alf. Harris; Tintinara—E. Bower, W. Worral, H. R. Becker, H. S. Williams; McLaren Flat—Robt. Guthrie, M. Kelly, Robt. Deane; Blackwood—H. A. Baust, A. F. Baust; Koolunga—T. M. G. Cameron; Snowtown Women's—Mrs. J. B. Kirchner, Mrs. P. O'Donnell, Mrs. T. O'Donnell, Miss K. O'Donnell; Saddleworth Women's—Miss M. S. Noble; Jervois—F. L. Stans, A. Rothe, C. Schultz; McLaren Flat Women's—Mrs. P. Penney, Mrs. Bert Elliott, Mrs. A. T. Nicolle, Mrs. Jas. Powell; Taplan—J. C. Kelly, R. Moffatt, W. Moffatt, T. Schwerdt, C. Schwerdt; Parrakie—P. Ross; Tantanoola—L. B. Medhurst, H. Bunston; Watervale—D. A. Munro; Mangalo Women's—Mrs. Gaston; Weavers—W. G. Agnew; Cummins—Bert Hinton; Clarendon—F. H. Menz, C. G. Easton; Echunga—R. Perry, H. E. Berry, C. F. Mead; A. H. Harvey, F. Mincham, Lloyd Hampton,

M. Kavanagh, G. Edmonds, H. J. Causby; Belalie Women's—Miss E. Mitchell; Balhannah—T. Drewett, F. Ball, J. R. Pfeiffer, H. L. Pfeiffer, S. H. G. Grivell, A. F. Altmann; Balumbah—T. M. Wright; Kyancutta—W. J. Rorke, T. McGuinness; Kelly—F. K. Parsons, G. T. Parsons, Jas. Liddicoat, Jas. M. McMurtrie, T. W. Hutchens, R. G. Hall, R. J. Beinke, F. J. Wakelin; Beetaloo Valley—C. Holmes; Mount Compass—F. N. Simpson; Kalangadoo Women's—Mrs. T. Hemmings.

Bureau Statistics.—Number of members, 7,610; number of Branches, 337.

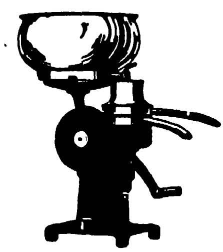
Several items were discussed in Committee.

BREEDING, FEEDING, AND DISEASES OF DAIRY CATTLE.

The Library of the Department of Agriculture acknowledges the receipt of the July, 1934, issue of *The Veterinary Journal.* This number is devoted to the breeding, feeding, and diseases of dairy cattle, and copies can be obtained from the publishers, Messrs. Baillière, Tindall & Cox, Henrietta Street, Covent Gardens, London, W.C.2. Price 2s. 2d., post free.

WIMMERA RYE GRASS ON EYRE'S PENINSULA.

In his report on the agricultural prospects at the end of August, Mr. H. D. Adams (Agricultural Instructor for Lower Eyre's Peninsula) says that many farmers who sowed sections of their holdings with Wimmera Rye Grass and Lucerne this year have reported good germination and growth of many fine plots of Rye Grass. That of Mr. G. Pasper, in the hundred of Butler, is outstanding and equal to anything he (Mr. Adams) had seen in this or any other State, and gives promise of a heavy yield of seed, for which purpose it was sown



DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIMITED, reported on September 4th, 1934:—

BUTTER.—Conditions in connection with dairying throughout August improved somewhat as there were several periods when general rains were received. The precipitations, however, were only light, but were sufficient to keep the pastures going, and, consequently, the supplies of cream and butter showed a forward movement. Production in this State, however, is still very much lower than last season, and heavy subsoil soaking rains are required to ensure late spring and summer feed. Trade generally has been well maintained, and, although the London market has shown very little fluctuation, the local print trade was well maintained, and the prices paid to the farmers for butterfat were satisfactory. At the date of report choicest Kangaroo butter in London was selling at 74s. per cwt., and the following were the local prices:—Choicest creamery fresh butter in bulk, 1s. per lb.; prints and delivery extra. (These prices are subject to stabilisation levies.) Store and collectors' lots, 6½d. to 7½d. per lb. at store door, according to quality.

CHEESE.—The South-Eastern factories sent forward ample consignments of new cheese each week for local and Westralian trade, but the turnover was somewhat disappointing, as many of the larger retail distributors had stocks in cold store which they had purchased earlier in the year at lower prices. However, sales are now moving a little more freely. In the meantime the factories are making their surplus into export-size cheese, and these will be shipped to London from time to time. The present market rates for local cheese are as follows:—Large and medium, 8¼d. to 8¾d. per lb.; loaf, 8¾d. to 9¼d. per lb.; semi-matured and matured, 8¾d. to 9½d. per lb.

EGGS.—The season has been very backward as regards egg production, due largely to the unseasonably dry conditions which ruled. However, the supplies are coming along more freely, and, as exporting is now in full swing, rates have come back to export parity. Market rates are:—Ordinary country eggs, fair average quality, 8½d. per dozen net; export quality, 1⅞oz. and over, up to 10½d. per dozen net.

BACON.—Manufacturers consigned ample quantities each week for all requirements, and the local trade was well supplied. Some interstate trade was also done. Hams continued slow of sale, but until the warmer weather sets in this must be expected. Quotations are:—Best quality sides, 9d. to 9½d. per lb.; middles, 10d. to 10½d. per lb.; rolls, 7½d. to 8d.; hams, 11d. to 11½d.; cooked, 1s. 1½d. to 1s. 2d. per lb. Lard, prints, 5½d. per lb.

ALMONDS.—Most growers have, ere this, considerably reduced stocks, but odd consignments came along in the open markets each week and ready sales were effected. Kernels were hardly in such good request as earlier in the year, but trade is now showing a little improvement in these. Softshells and Brandis, 8½d. to 9d. per lb.; hardshells, 5½d. per lb.; kernels, 1s. 11d. to 2s. per lb.

HONEY.—The turnover in this commodity has continued disappointing, although nice quality consignments were available. Some odd interstate shipments were made, but these, together with the local trade, were insufficient to clear stocks from week to week. Prime quality clear extracted, 3d. to 3½d. per lb.; lower grades, 2d. to 2½d. per lb.

BEESWAX.—All consignments met with ready sale; 1s. 4d. to 1s. 4½d. per lb., according to quality.

POTATOES.—Prime Victorian Carmens, 9s. per cwt.

ONIONS.—Brown Spanish, 9s. per cwt.

LIVE POULTRY.—With the near approach of the Duke of Gloucester's visit and the Royal Agricultural Show, it is expected that there will be a large influx of visitors to the city, and, in anticipation of this, poulterers are now buying heavily and having stocks placed away in refrigerators to meet the extra demand. Sales, therefore, have been very brisk and values have moved forward. We advise consigning. Crates loaned on application. The following are the prices realised at the date of this report:—Prime roosters, 3s. 10d. to 5s.; nice-conditioned cockerels, 3s. 4d. to 3s. 9d.; fair-conditioned cockerels, 2s. 9d. to 3s. 2d.; chickens lower; heavyweight hens, 3s. 2d. to 3s. 9d.; medium hens, 2s. 6d. to 3s.; light hens, 2s. to 2s. 5d.; couple of pens of weedy sorts lower. Prime young Muscovy drakes, 4s. to 5s. 6d.; young Muscovy ducks, 2s. 8d. to 3s. 5d.; ordinary ducks, 1s. 9d. to 2s. 7d.; ducklings lower. Geese, 3s. 3d. to 4s. 9d.; goslings lower. Turkeys, good to prime condition, 9d. to 11½d. per lb. live weight; turkeys, fair condition, 7d. to 8d. per lb. live weight; turkeys, poor and crooked breasted, lower. Pigeons, 6½d. to 7½d. per lb.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of August, 1934, also the average precipitation for August, and the average annual rainfall.

Station.	For Aug., 1934.	Av'ge. for Aug.	Av'ge. Annual Rain-fall.
Far North and Upper North.			
Oodnadatta	—	0·19	4·69
Marree	—	0·37	5·93
Farina	0·05	0·41	6·48
Copley	0·63	0·63	7·93
Beltana	0·66	0·65	8·53
Blinman	1·14	1·06	11·92
Hookina	0·54	1·18	11·46
Hawker	0·83	1·40	12·31
Wilson	0·93	1·22	11·82
Gordon	0·86	1·06	10·59
Quorn	1·15	1·71	13·29
Port Augusta	0·76	0·89	9·46
Bruce	0·82	1·08	9·95
Hammond	0·76	1·27	11·27
Wilmington	1·88	2·14	17·43
Willowie	1·76	1·39	12·28
Melrose	4·18	2·72	22·94
Booleroo Centre	2·45	1·82	15·23
Port Germein	1·84	1·37	12·55
Wirrabara	3·47	2·40	19·34
Appila	2·16	1·69	14·66
Cradock	0·69	1·13	10·83
Carrieton	1·71	1·46	12·29
Johnburg	1·22	1·22	10·59
Eurelia	1·81	1·59	12·85
Orroroo	2·00	1·55	13·23
Nackara	1·07	1·12	11·18
Black Rock	1·88	1·45	12·43
Oodlawirra	1·36	1·30	11·67
Peterborough	1·93	1·54	13·27
Yongala	2·47	1·80	14·47
North-East.			
Yunta	0·18	0·73	8·54
Waukaringa	0·44	0·73	7·97
Mannahill	0·34	0·71	8·21
Cookburn	0·08	0·64	7·98
Broken Hill, N.S.W.	0·36	0·80	9·57
Lower North.			
Port Pirie	1·98	1·39	13·26
Port Broughton	1·69	1·67	13·92
Bute	1·57	1·96	15·49
Laura	2·94	2·19	17·99
Caltowie	2·78	2·10	16·75
Jamestown	2·84	2·24	17·75
Gladstone	2·86	2·01	16·33
Crystal Brook	2·79	1·94	15·82
Georgetown	2·06	2·26	18·41
Narridy	2·08	1·97	15·88
Redhill	2·37	2·19	16·61
Spalding	2·03	2·45	18·99
Gulnare	2·38	2·44	18·71
Yacka	1·69	2·03	15·40
Koolunga	1·52	2·01	15·43
Snowtown	1·69	2·11	15·71
Lower North—*continued*.			
Brinkworth	1·97	2·08	15·83
Blyth	1·45	2·04	16·80
Clare	2·64	3·07	24·56
Mintaro	2·76	3·33	23·47
Watervale	3·36	3·63	26·91
Auburn	3·34	3·03	24·00
Hoyleton	1·78	2·16	17·35
Balaklava	1·64	1·82	15·49
Port Wakefield	1·72	1·47	12·96
Terowie	1·61	1·63	13·40
Yarcowie	1·53	1·62	13·63
Hallett	1·76	2·16	16·48
Mount Bryan	2·14	2·27	16·81
Kooringa	2·33	2·20	17·92
Farrell's Flat	2·46	2·53	18·68
West of Murray Range			
Manoora	2·56	2·58	18·93
Saddleworth	2·77	2·48	19·61
Marrabel	3·09	2·74	19·94
Riverton	3·28	2·71	20·81
Tarlee	2·90	2·26	18·13
Stockport	2·84	2·06	16·97
Hamley Bridge	2·09	1·97	16·61
Kapunda	2·54	2·45	19·82
Freeling	1·73	2·25	17·88
Greenock	3·09	2·83	21·57
Truro	2·27	2·62	19·95
Stockwell	2·30	2·57	20·17
Nuriootpa	3·14	2·70	20·72
Angaston	2·74	2·93	22·47
Tanunda	2·95	2·82	22·03
Lyndoch	2·89	3·16	23·46
Williamstown	3·04	3·81	27·77
Adelaide Plains.			
Owen	1·77	1·90	14·53
Mallala	1·68	1·94	16·59
Roseworthy	3·09	2·15	17·39
Gawler	2·52	2·25	18·97
Two Wells	2·48	1·82	15·75
Virginia	2·79	2·09	17·18
Smithfield	3·14	2·20	17·65
Salisbury	3·48	2·29	18·59
Adelaide	4·15	2·52	21·15
Glen Osmond	4·82	3·20	26·03
Magill	4·04	3·12	25·60
Mount Lofty Ranges.			
Teatree Gully	4·82	3·40	27·33
Stirling West	9·71	6·29	47·05
Uraidla	6·62	5·88	44·19
Clarendon	5·22	4·26	32·89
Morphett Vale	4·16	2·72	22·68
Noarlunga	3·64	2·47	20·41
Willunga	4·42	3·20	26·03
Aldinga	3·50	2·47	20·28

RAINFALL—*continued.*

Station.	For Aug. 1934.	Av'ge. for Aug.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*			
Myponga	5·19	3·61	29·68
Normanville	3·30	2·50	20·73
Yankalilla	3·16	2·71	22·90
Mount Pleasant	3·32	3·62	27·24
Birdwood	5·07	4·02	29·24
Gumeracha	5·94	4·57	33·44
Millbrook Res.	6·99	4·83	34·82
Tweedvale	7·13	5·00	35·97
Woodside	4·61	4·43	32·30
Ambleside	5·65	4·81	34·90
Nairne	4·09	3·58	28·17
Mount Barker	5·03	4·15	31·97
Echunga	5·63	4·26	33·26
Macclesfield	4·52	3·87	30·44
Meadows	5·18	4·57	36·21
Strathalbyn	3·57	2·32	19·32
MURRAY FLATS AND VALLEY			
Meningie	2·02	2·19	18·42
Milang	2·20	1·67	14·97
Langhorne's Ck.	3·24	1·70	14·90
Wellington	2·82	1·64	14·70
Tailem Bend	2·44	1·69	15·08
Murray Bridge	2·18	1·46	13·64
Callington	2·60	1·81	15·22
Mannum	1·74	1·23	11·53
Palmer	2·60	1·97	15·55
Sedan	1·03	1·51	12·11
Swan Reach	1·11	1·14	10·62
Blanchetown	0·60	1·12	11·03
Eudunda	2·19	2·24	17·18
Sutherlands	0·88	1·36	10·88
Morgan	0·69	0·95	9·21
Waikerie	1·02	1·06	9·70
Overland Corner	0·54	1·00	10·37
Loxton	1·27	1·33	11·65
Berri	1·10	1·27	10·32
Renmark	1·24	1·08	10·49
WEST OF SPENCER'S GULF			
Eucla	0·90	0·95	9·98
Nullarbor	0·85	0·99	8·84
Fowler's Bay	1·79	1·47	11·93
Penong	2·43	1·63	12·23
Koonibba	2·08	1·68	12·11
Denial Bay	2·24	1·55	11·52
Ceduna	2·80	1·33	10·16
Smoky Bay	1·84	1·41	10·51
Wirrulla	1·89	1·60	10·50
Streaky Bay	2·54	2·03	14·88
Chandada	2·15	—	—
Minnipa	1·71	2·03	13·87
Kyancutta	2·25	—	—
Talia	2·49	2·25	14·63
Port Elliston	2·46	2·35	16·50
Yeelanna	2·61	2·46	16·02
Cummins	2·71	2·80	17·61
Port Lincoln	2·66	2·67	19·43
Tumby	2·24	1·78	14·14
Ungarra	2·66	2·28	16·87
Port Neill	1·51	1·56	13·16

Station.	For Aug. 1934.	Av'ge. for Aug.	Av'ge. Annual Rain-fall.
WEST OF SPENCER'S GULF—*continued.*			
Arno Bay	2·08	1·47	12·63
Rudall	2·08	1·73	13·12
Cleve	2·70	1·82	14·79
Cowell	1·05	1·12	11·12
Miltalie	2·49	1·51	13·64
Darke's Peak	2·21	2·29	15·23
Kimba	2·26	1·62	11·84
YORKE PENINSULA.			
Wallaroo	2·01	1·56	13·99
Kadina	2·00	1·89	15·69
Moonta	1·92	1·70	15·10
Paskeville	2·06	2·12	15·52
Maitland	3·17	2·55	19·97
Ardrossan	1·21	1·79	13·98
Port Victoria	2·03	1·90	15·49
Curramulka	3·14	2·32	17·95
Minlaton	2·93	2·39	17·85
Port Vincent	2·21	1·81	14·50
Brentwood	2·76	1·98	15·58
Stansbury	2·79	2·16	16·84
Warooka	3·27	2·38	17·53
Yorketown	2·78	2·22	16·94
Edithburgh	2·86	2·04	16·40
SOUTH AND SOUTH-EAST.			
Cape Borda	4·98	3·43	24·86
Kingscote	3·28	2·53	19·16
Penneshaw	4·28	2·51	19·02
Victor Harbour	3·99	2·51	21·42
Port Elliot	3·81	2·34	19·95
Goolwa	3·63	2·02	17·87
Copeville	1·92	1·33	11·57
Meribah	0·96	1·05	11·46
Alawoona	1·54	1·10	10·29
Mindarie	1·74	1·55	12·22
Sandalwood	1·87	1·72	13·73
Karoonda	1·92	1·88	14·48
Pinnaroo	1·03	1·75	14·57
Parilla	1·43	1·73	14·01
Lameroo	1·30	1·90	16·10
Parrakie	1·82	1·94	14·64
Geranium	1·63	2·23	16·53
Peake	2·52	2·03	16·13
Cooke's Plains	3·21	1·82	15·43
Coomandook	3·25	2·10	17·20
Coonalpyn	2·47	2·13	17·53
Tintinara	2·80	2·22	18·73
Keith	2·81	2·13	17·96
Bordertown	2·21	2·22	19·26
Wolseley	2·86	2·22	18·52
Frances	1·98	2·50	20·01
Naracoorte	2·72	2·77	22·63
Penola	3·09	3·31	26·05
Lucindale	2·83	3·03	23·29
Kingston	3·85	3·10	24·37
Robe	3·55	3·30	24·68
Beachport	3·72	3·55	27·07
Millicent	5·05	3·86	29·81
Kalangadoo	4·15	4·17	32·38
Mount Gambier	3·72	3·89	30·55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings. Sep.	Oct.
Adelaide	*	—	—
Alawoona	*	—	—
Allandale East	*	21	19
Alma	*	—	—
Appila-Yarrowie	†	7	5
Arthurton	A.M.	—	—
Ashbourne	*	19	17
Auburn Women's	*	—	—
Balaklava	*	23	28
Balhannah	*	—	—
Balhannah Women's	*	19	—
Balumbah	†	—	—
Balumbah Women's	†	5	3
Beetaloo Valley	†	17	22
Belalie Women's	†	11	2
Berri	*	18	23
Belvidere	*	—	—
Blackheath	†	27	25
Black Rock	*	—	—
Black Springs	†	2	23
Blackwood	*	10	8
Blyth	*	28	26
Booborowie	†	17	22
Booleroo Centre	*	21	19
Boolgun	*	—	—
Boor's Plains	†	6	4
Borrika	*	—	—
Bowhill	*	17	22
Brentwood	†	6	4
Brinkley	*	19	17
Brinkworth	*	17	22
Brownlow	†	—	—
Buchanan	A.M.	—	—
Bute	†	20	18
Butler	†	—	—
Caliph	*	4	2
Caralue	*	19	17
Carrow	*	19	17
Ceduna	*	—	—
Charra	*	—	—
Cherry Gardens	†	—	—
Chilpuddie Rock	†	—	—
Clare Women's	†	1	6
Clarendon	*	12	15
Cleve	*	1	6
Collie	*	5	3
Coomandook	*	28	26
Coonawarra	*	20	25
Coonawarra Women's	A.M.	19	17
Cummins	†	14	12
Cungena	†	6	4
Currency Creek	A.M.	24	22
Dudley	*	—	—
Echunga	†	12	10
Elbow Hill	*	20	18
Eudunda	*	3	1
Eurelia	*	8	13
Eurelia Women's	*	5	3
Farrell's Flat	*	21	26
Finnis	†	—	—
Frances	268	—	—
Frayville	†	20	18
Gawler River	*	—	—

Branch.	Report on Page.	Dates of Meetings. Sep.	Oct.
Georgetown	*	22	20
Geranium	*	29	27
Gladstone	†	21	19
Gladstone Women's	†	18	16
Glencoe	*	11	9
Goode	†	—	—
Goode Women's	*	—	—
Greenock	†	17	15
Green Patch	†	20	18
Gumeracha	*	24	22
Hanson	*	18	23
Hartley	*	—	—
Hindmarsh Island	*	—	—
Hope Forest	†	3	1
Hope Forest (Wom's)	*	—	—
Hoyleton	*	17	15
Inman Valley	*	20	18
Jamestown	*	19	17
Jervois	*	13	11
Kalangadoo Women's	*	8	13
Kalangadoo	*	8	13
Kalyan	*	19	17
Kangarilla Women's	†	20	18
Kanni	*	—	—
Kapinnie	*	—	—
Kapunda	*	14	12
Karoonda	*	26	24
Keith	*	20	18
Kelly	†	1	6
Ki Ki	*	—	—
Kilkerran	*	20	18
Kongorong	*	17	22
Koolunga	*	—	—
Koonibba	*	20	18
Koonunga	†	—	—
Koppio	†	26	24
Kringin	*	24	22
Kuitpo	†	19	17
Kulkawirra	*	11	9
Kyancutta	A.M.	4	2
Kybybolite	*	20	18
Kybybolite Women's	282	18	23
Lameroo	*	22	20
Langhorne's Creek	*	19	17
Laura	*	22	20
Laura Bay	‡	—	—
Laura Bay Women's	†	11	—
Lensw'd & F'st Range	†	—	—
Light's Pass	†	—	—
Lipson	*	22	20
Lone Gum & Monash	*	19	17
Lone Pine	*	17	22
Lowbank	*	19	17
Loxton	*	14	12
Lyndoch	*	18	23
McLaren Flat	*	—	—
McLaren Flat Wm's	287	6	4
Macclesfield	*	20	18
MacGillivray	*	18	23
Mallala	*	17	15
Maltee	*	20	18
Mangalo	*	—	—
Mangalo Women's	286	12	10

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. Sep.	Dates of Meetings. Aug.
Marama	A.M.	—	—
Meadows	*	19	17
Milang	272	8	13
Millicent	†	28	26
Millicent Women's	A.M.	—	—
Miltalie	*	22	20
Monarto South	271	—	—
Monarto Sth. Wm's	†	15	20
Moorlands	*	26	—
Morchard	†	21	19
Morchard Women's	†	26	24
Mount Barker	*	17	15
Mount Bryan	*	—	—
Mount Compass	*	—	—
Mount Gambier	†	14	12
Mount Hope	†	18	16
Mount Pleasant	*	14	12
Mudamuckla	*	8	13
Mundalla	†	—	—
Mundalla Women's	†	20	25
Murray Bridge	*	26	24
Murraytown	†	—	—
Mypolonga	†	—	—
Myponga	*	20	18
Myrla	*	19	17
Nantawarra	†	20	18
Naracoorte	*	8	13
Narridy	†	—	—
Narrung	*	—	—
Nelshaby	*	—	—
Nelshaby Women's	*	—	—
Netherton	*	19	17
Nunjikompita	*	20	18
Nunkeri	272	20	18
O'Loughlin	*	10	8
O'Loughlin Women's	†	—	—
Overland Corner	*	19	17
Owen	*	10	8
Palabie	A.M.	—	—
Parilla	*	18	16
Parilla Women's	*	19	17
Parilla Well	*	24	22
Parilla Well Women's	*	25	30
Parrakie	*	—	—
Parrakie Women's	†	25	30
Paruna	*	7	5
Paskeville	*	18	23
Pata	*	7	5
Penola	A.M.	1	6
Penola Women's	A.M.	—	—
Penwortham	†	19	17
Petersville	*	18	23
Petina	*	22	27
Pinbong	*	—	—
Pinnaroo	*	—	—
Pinnaroo Women's	†	7	5
Port Elliot	*	—	—
Pygery	‡	18	23
Pygery Women's	*	—	—
Quorn	*	—	—
Ramco	*	17	22
Redhill	*	—	—
Rendelsham	†	22	20
Rendelsham Women's	†	—	—
Renmark	*	—	—
Riverton	*	10	8
Roberts & Verran	*	—	—

Branch.	Report on Page.	Dates of Meetings. Sep.	Dates of Meetings. Aug.
Rosedale	†	—	—
Roseworthy	*	—	—
Rudall	*	18	16
Saddleworth	*	21	26
Saddleworth Women's	A.M.	4	2
Scott's Bottom	†	22	20
Shoal Bay	*	18	23
Smoky Bay	*	—	—
Snowtown	*	14	12
Snowtown Women's	†	6	4
South Kilkerran	*	18	23
Springton	*	5	3
Stanley Flat	†	17	15
Stockport	*	—	—
Strathalbyn	*	12	10
Streaky Bay	*	28	26
Sutherlands	A.M.	—	—
Talia	*	28	26
Tantanoola	†	1	6
Tantanoola Women's	†	5	3
Taplan	†	18	16
Taplan Women's	A.M.	—	—
Taragoro	†	20	18
Tarlee	†	11 & 17	—
Tatiara	A.M.	—	—
Tintinara	A.M.	—	—
Truro	269	17	21
Tulkineara	*	20	25
Tweedvale	*	20	18
Ungarra	*	27	25
Upper Wakefield	†	20	18
Uraidla & Su'merto'n	*	3	1
Waddikee Rocks	*	22	20
Waikerie	*	14	12
Wallala	*	12	10
Wanbi	*	26	24
Wandearah	*	18	23
Warcowie	*	18	23
Warcowie Women's	*	—	—
Warramboo	‡	18	23
Warramboo Women's	†	28	26
Wasleys	†	13	11
Wasleys Women's	†	6	4
Watervale	*	17	15
Wauraltee	*	18	23
Weavers	†	10	8
Wepowie	*	17	22
Wepowie Women's	*	—	—
Wilkawatt Women's	*	18	16
Williamstown Wm's	‡	5	3
Willowie	*	24	22
Wilmington	†	18	16
Wilmington Wm's	†	—	—
Wirrabara	*	—	—
Wirrilla	*	22	20
Wirrilla Women's	*	6	4
Wirrulla	*	19	17
Wolseley	*	10	8
Wudinna	*	—	—
Yadnarie	270	18	23
Yandiah	‡	14	12
Yaninee	*	—	—
Yeelanna	*	19	17
Yundi	†	19	17
Yurgo	*	—	—
Yurgo Women's	*	—	—

* No reports received during the month of August. † Held over. A.M. Annual meeting. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

FRANCES (Average Annual Rainfall, 20.01in.).

June 20th.—Attendance, 5.

TREE PLANTING.—Mr. A. Pfitzner read the following paper:—"As land becomes more intensely stocked, which is possible since superphosphate and farming have increased its carrying capacity, there is a tendency to subdivide the pastures into smaller paddocks. This has resulted in leaving some paddocks without sufficient timber to shelter the stock from the heat of summer and cold winds. The variety of timber most planted to supplement this deficiency in this district is the sugar gum and indeed it is hard to find a better. If planted in the right conditions it makes a rapid growth and soon forms an ideal break against the seasonal elements. They are also an excellent tree to plant in the form of an avenue and where ground is subject to heavy winter traffic, for they absorb the moisture and keep the ground firm with their roots. Seedlings can be raised by placing a bough with blossoms on a sheet of paper, in December the heat will burst the nuts, and the seed can then be collected and sown in seed boxes for transplanting later, or direct into well-prepared soil where it is desired to grow them. The plants require plenty of moisture until they are well established. The Native Bull-oak makes a good shelter for stock and it is advisable that sufficient should always be left when ringing, for it is possible that there will be a shortage in the future because they take so long to grow and sheep constantly nibble off the young shoots. In some places in the north of this State, Blue Gums have been planted successfully to provide shelter, but here they would probably reseed and become a nuisance. At one time settlers in this district were obliged to plant olives and sow an acreage of grain under the conditions of their lease, with the result that there are a number of olive groves scattered about the country. The Pepper Tree is also a valuable tree about a homestead, but is often planted too close to a garden where its roots wander in search of moisture, a more suitable place for them is in the sheep yards, where they do well if railed off. Horses and cattle also have a much better chance of getting away from bots and other flies if they can move freely in a shelter plantation, until evening when they can go away to feed and water. An idle horse loses as much in condition and energy as a horse in work if it has to fight flies in an open paddock. It is impossible for sheep and cattle to give their best returns if their backs are blistered by the sun. We should protest strongly against the destruction of Bull-oak and other trees growing along roadsides and on reserves, in some cases to make way for telephone wires, and in others for firewood or because someone imagines they impoverish their land nearby. (Secretary, C. Koch.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Millicent	29/6/34	10	"Colic in Horses," G. Major	L. Hutchesson
Tantanoola	7/7/34	12	Annual Meeting	L. Osborne
Allandale East .	20/7/34	11	Address—A. L. Warren .	J. Laslett
Rendelsham ...	21/7/34	10	Annual Meeting	F. Todd, jun.
Mundalla	19/7/34	60	Address—A. L. Warren .	A. Ross
Millicent	27/7/34	9	Annual Meeting	L. Hutchesson
Tatiara	18/7/34	—	Address—A. L. Warren ..	L. Butler
Tintinara	3/8/34	11	Annual Meeting	E. Bower
Frances	1/8/34	7	Annual Meeting	E. Herold
Penola	17/8/34	7	Annual Meeting	F. Hinze

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Morchard	22/6/34	12	"Marketing Wheat," C. Llewellyn	E. Tillbrook
Warcowie	19/7/34	50	Annual Social	A. Crossman
Wilmington	21/8/34	14	"Plough Shares," E. Hampel	C. Cole

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Appila	6/7/34	14	"Seeding," F. Winter ...	E. Wurst
Beetaloo Valley	25/6/34	12	"Fallowing," T. Jones...	B. Giddings
Murraytown ...	26/5/34	14	"Sheep on the Farm," B. Starr	E. Pitman
Murraytown ...	23/6/34	10	"The Tractor," D. Bleischke	E. Pitman
Booborowie	23/7/34	14	"Specialisation of Labour," P. Kilderry	A. Fairchild
Yandiah	13/7/34	14	"Utilising Waste Material," A. Borgas	O. Borgas
Yandiah	19/7/34	22	Address—W. J. Spafford	O. Borgas
Narridy	4/8/34	20	Address—E. L. Orchard .	J. Klingner
Appila	3/8/34	12	"Cows as a Side Line." L. Klemm	E. Wurst
Beetaloo Valley	20/8/34	10	Discussion	B. Giddings
Booborowie	16/8/34	10	"Ensilage," K. Kain ...	A. Fairchild
Murraytown ...	25/8/34	10	Address—E. L. Orchard .	E. Pitman

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

TRURO (Average annual rainfall, 19.95 in.).

May 21st.—Attendance, 17.

THE PRESENT DAY PROBLEMS OF THE FARMER.—The following paper was read by Mr. E. Schilling:—"There are so many problems confronting the farmer at the present time that it is a difficult task to solve any of them. Wheat has always been the main line of production on the farm, but it has now fallen to such a low price that we have to consider whether we can make more out of our farms by paying greater attention to side-lines. For some years previous to, and up to the present time, farmers have concentrated on wheat production for the obvious reason that taking all factors into consideration wheat growing paid to concentrate upon. But as the supplies far exceed the demand, the amount of wheat which the world is able to purchase and consume has fallen far short of the amount produced. Huge surpluses of grain have forced the farmer to accept the lowest prices known in the history of the wheat industry, thus leaving no ground for hope of a better price in the near future. Our industry has to purchase its many requirements for successful production at a very inflated price, whilst we have no method of passing on costs of production to the consumer as the wheat industry is not on the same plane of favour as other protected industries. The position of the industry is that if carried on at the present stage it is no longer an occupation and a living, but a burden. As super and cornsack prices and many other items necessary on a farm do not seem to decrease much more, I am of the opinion that there is nothing else left to do but to try and cut expenses wherever possible, and pay more attention to sidelines such as sheep, lambs, dairy products and beef, bacon and poultry, as they are contributing more towards the farmer's living than the major item—wheat—is doing. Sheep will probably appeal to most, especially as wool has advanced in price, sheep also give an indirect return because they help to clean the fallow and improve the soil. Cows and a few fowls will also help to contribute towards the farmers wife's requirements. Where cows are kept, some pigs will be a help, they supply most of the household's necessary supply of meat, and secondly, if taken to the market at the right age, there is a good demand and they bring a fair price. If these sidelines are carefully attended to and the maximum of wheat grown we will be able to creep along and reap the benefit when the price of wheat rises. Do not lose heart, the wheat price will and must improve. Be there and benefit when it does." (Secretary, L. Davis.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Stanley Flat ...	9/4/34	–	"Mensuration," C. Clarke	P. Quirke
Brownlow	27/6/34	19	"Blacksmithing," A. O. Steinborner	A. R. Steinborner
Frayville	21/6/34	11	"Co-operation," H. Scheer	H. Ramm
Blyth..........	29/6/34	15	"Fallowing and its History," L. Palmer	R. Eime
Balaklava	23/7/34	9	Annual Meeting	R. Schaefer
Koonunga......	25/7/34	19	Address—B. Boehm ...	H. Mibus
Brownlow	27/7/34	19	Debate	A. Steinborner
Wasleys	19/7/34	14	Address—C. R. Kelly ...	C. Currie
Frayville	26/7/34	17	Debate	H. Ramm
Light's Pass ...	23/7/34	30	Annual Meeting	C. Verrall
Black Springs ..	24/7/34	8	Paper—P. Abbott	K. Dunn
Penwortham ...	25/7/34	16	Annual Meeting	A. Jenner
Rosedale	23/7/34	22	Address—R. Baker	S. Sincock
Buchanan	3/8/34	—	Annual Meeting	L. Bell
Nantawarra	31/7/34	12	Annual Meeting	T. Dixon
Upper Wakefield	19/7/34	7	"Fat Lambs," P. Cleary	C. Neumann
Stanley Flat ...	25/6/34	—	Annual Meeting	P. Quirke
Stanley Flat ...	6/8/34	—	Discussion	P. Quirke
Wasleys	9/8/34	14	Address—G. H. Clarke, B.Sc.	C. Currie
Tarlee	14/8/34	11	Address—T. Rodda	N. Clarke
Brownlow	22/8/34	22	Address—Mr. Burpee ...	A. Steinborner
Koonunga......	22/8/34	20	Address—J. B. Harris ...	H. Mibus
Sutherlands	2/8/34	80	Annual Social	E. Schiller

YORKE PENINSULA DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kilkerran	25/6/34	7	"Motor Vehicles on the Farm," B. Koch	G. Heinrich
Bute	19/7/34	15	Discussion	H. Perry
Bute	23/8/34	12	Discussion	H. Perry
Arthurton	19/7/34	24	Annual Meeting	T. Howlett
Boor's Plains ..	2/8/34	15	Annual Meeting	S. Chynoweth
Weavers	31/7/34	14	Address—E. H. Giles ...	H. Cornish

WESTERN DISTRICT.

YADNARIE (Average annual rainfall, 14.09in.).

July 3rd.—Attendance, 18.

MIXED FARMING.—Paper read by Mr. W. L. Brown.—"There is an old maxim that the wise man never puts all his eggs into one basket. The principle still holds good although conditions have altered since that was first penned. The man who has several strings to his bow may not make a fortune so quickly as the man who concentrates upon one line of production, but his position always is safer, for he is certain of some income. This season the wheatgrower has fared badly, while those who last year devoted all their land to wool growing made remarkably large incomes in many instances. The fact cannot be ignored, however, that had a drought or disease affected their flocks, or had the bottom fallen out of the market instead of doing so well, in numerous cases they would have been badly hit financially. In so far as it means gaining a thorough knowledge of any particular subject, specialisation has much to commend it. The man who makes himself a master of dairying, sheep breeding, wheat growing, &c., is always more likely to register success with those enterprises than the man who merely dabbles in them, or changes from one to the other, simply because he lacks determination. The men who have won world-wide reputations have been those who have specialised. Make yourself a recognised authority on one subject if possible,

be it cultivation of wheat or the production of fruit, but at the same time do not overlook the possibilities of other suitable means of earning a living. What is of interest to one member of the family is not to another, and by turning aside or diverting one's attention to other lines of earning revenue adds considerably to your happiness, and encourages the interest of your children in the work of the farm. To know thoroughly one department of work is good, to turn that knowledge to the best account is better. The facilities for acquiring knowledge are open to most of us. But it is not these facilities that carry one man ahead of others, but the possession and extension of his own personal qualities. When a man has served his apprenticeship and worked hard and become skilled on the land or workshop, and becomes a professional or business man, the possession of such knowledge wakes him up, opens his eyes to possible uses of his acquired skill, widens his outlook, and establishes his standing among other men. It makes of him an individual, a strong personality, as well as a sound and constructive worker.'' (Secretary, E. Spriggs.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Miltalie	23/6/34	8	Discussion	G. Smith
Miltalie	26/5/34	20	" Home Price for Wheat," G. Payne	G. Smith
Mount Hope....	5/7/34	7	" Seeding," J. Vigar	A. Myers
Butler	24/4/34	8	" Shoeing Horses," N. Stewart	P. Lange
Butler	22/5/34	17	" Farm Smithy," D. Stewart	P. Lange
Butler	19/6/34	10	Question Box	P. Lange
Mount Hope....	24/7/34	9	" Farm Management," R. Myers	J. Vigar
Wudinna.......	23/6/34	21	Homestead Meeting	D. Duguid
Taragoro	26/7/34	8	Annual Meeting	T. Winters
Pygery	24/7/34	9	Address—W. H. Brownrigg	A. Day
Yadnarie.......	24/7/34	14	" Book-keeping," J. Mackie	E. Spriggs
Koppio	25/7/34	11	Annual Meeting	M. Gardner
Goode	25/7/34	15	Annual Meeting	E. Fear
Chilpuddie Rock	25/7/34	8	" Fallowing," Mr. Brown.	H. Brown
Green Patch ...	26/7/34	12	Annual Meeting	C. Whillas
Palabie	27/7/34	10	Annual Meeting	C. Rashleigh
Warramboo	3/8/34	9	Discussion	F. Chilman
Kyancutta	7/8/34	11	Annual Meeting	E. Kelly
Cungena	3/8/34	10	Paper from *Journal*	A. Voumard
Butler	20/8/34	12	Debate	C. Jericho
Goode	22/8/34	11	Discussion	E. Fear
Laura Bay	10/8/34	15	Annual Meeting	P. Morrison

EASTERN DISTRICT.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

June 16th.—Attendance, 22.

BOOKKEEPING.—Mr. H. Hartmann read the following paper:—''In these days of depression reference is often made to the necessity for efficient farming methods, but this is only carrying the job half-way if the farmer does not keep books. To do this it is not necessary to have an elaborate arrangement of books for keeping an accurate account of all business transactions. Too much attention cannot be paid to the keeping of accounts of small items, for it is astounding to what figure these small amounts add up to at the end of the financial year. There are various ways of bookkeeping, but I favour the method of only keeping one fairly large book—a folioed ledger; one with the pages lettered in alphabetical order. Under the different letterings it is possible to enter the various items with the page number. In his way it is simplicity itself to look up the financial position or enter any item. Any attempt at book-keeping is quite useless if not done thoroughly. All items of receipts and expenditure must be included. Make a record of any business in the book at once, while it is still fresh in your memory. If every farmer kept a close check on all his business in this way it would do much to aid him, especially if his books tells him that any phase of farming operations is being run at a loss.'' (Secretary, C. Altmann.)

NUNKERI.

June 21st.—Attendance, 14.

CARE OF FARM HORSES.—The following paper was head by Mr. E. Harding:—"As a farmer's livelihood depends upon his horses, it behoves him to give them reasonable care and attention. A good stable, warm in winter and cool in summer, will go a long way towards keeping them in good working condition. After long spells, horses should be given only two or three hours' work for the first day or two, gradually increasing the length of time up to a full day's work. If horses are worked full days from the offset they fall away in condition. Working horses are only capable of doing a given amount of work each day. If pushed beyond this point they will not do so much work, because after a time the team will be weary and not travel so well. Allow them as much water as they will drink three times daily, and I prefer to feed with good oaten chaff; always feed enough, but see that they eat up what is given them. It should be the aim of every farmer to keep his horses in good condition; it takes less feed to keep them in good condition than it does if they get in poor condition. Do not work after sundown—the sweat will not dry overnight and is likely to cause a chill. Horses should be well groomed each morning before going to work; this not only adds to their appearance but also assists in keeping them in good health. Always pay attention to the shoulders when harnessing or grooming; any sores that appear will then be noticed. If collars are kept in good order and fit well there should not be much trouble with sores. Keep the hoofs trimmed. If they become too long they break and split, which often causes lameness. The tail should be pulled each year during May or June; this will give it time to gain proper length so that it will be useful to the animal to protect itself from flies. Pay attention to the mane to see that no knots gather that may interfere with the comfort of the collar. Horses should never be overloaded; with an extra horse in the team you will do more work in a day, have the horses looking better, and less sore shoulders to contend with." Mr. Bruce said that horses which were liable to sore shoulders should be worked with a breastplate. Mr. H. Sanders recommended a tandem team when working eight or more; it was easier on the horses' shoulders and lighter draught. (Secretary, E. Peltz.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretar
Ramco	31/5/34	6	"Pruning," E. Miller ...	J. Odgers
Ramco	25/6/34	11	"Manures," E. Leishman	J. Odgers
Marama	27/6/34	9	Discussion	T. Hinkley
Marama	8/8/34	10	Annual Meeting	T. Hinkley
Ramco	23/7/34	9	Annual Meeting	J. Odgers
Coomandook ...	27/7/34	10	Annual Meeting	W. Trestrail
Mypolonga	18/7/34	18	Address, R. Baker	R. Llewellyn

SOUTH AND HILLS DISTRICT.

MILANG (Average annual rainfall, 14.97in.).

July 21st.—Attendance, 13.

UTILISING A SMALL HOLDING TO THE BEST ADVANTAGE.—Paper read by Mr. H. Vivian:—"It is hard to know how to utilise a holding of any acreage to much advantage at the present time, but a small holding in this locality is more suitable for dairying than for any other purpose.

SUBDIVISION.

It will be necessary to subdivide the holding into small paddocks so that a system of rotating grazing may be practised, otherwise the cows will be wandering over the whole areas just picking out the sweetest pastures leaving the other to grow rank. Again there is the advantage in a suitable year of being able to close a paddock for the making of meadow hay which is a valuable standby in lean years. Perhaps with top-dressing and the sowing of suitable grasses it may be possible to cut out the growing of cereals for hay. This point is an important one to the man on a small holding; he has not the land lying idle in bare fallow, which is essential if he is to be assured of a payable cut. It is very necessary that he grow all his fodders. If he has to buy chaff at present price of butterfat there would not be any margin of profit.

FODDER RESERVES.

If one could reserve enough fodder to feed his cows from April to July he should have no trouble in producing sufficient for the rest of the year. We are favoured in this locality with an abundance of good sub-artesian water which can be utilised

cheaply for irrigation purposes. I would grow lucerne for preference. When established it remains for quite a number of years and will produce in abundance if treated correctly. I prefer an engine and centrifugal pump to windmills for irrigation, as one can do the job quicker and there is no inconvenience in waiting for wind when water is wanted urgently. I am convinced that by making the fullest use of this water therein lies our greatest chances of success. One can use lucerne to feed breeding sows between litters, excellent greenfeed for poultry, and any surplus makes good hay. I can grow a ton of lucerne hay cheaper than I can produce a ton of cereal hay, and have the advantage of grazing the lucerne paddocks when the others in cereal would be closed.

Before taking up a holding in this district I inspected a number of blocks along the river. I was greatly impressed by the number of cows these men were carrying on very small holdings; only a few acres of high land, the rest being under irrigation. I feel convinced that if we were to go in for irrigation more extensively we could increase our carrying capacity enormously. A small holder should not fail to explore every avenue where he might add to his income.

PIGS AND POULTRY.

If he is making dairying his main item, pigs should be second consideration. It would pay the small holder better to keep the sows for breeding and sell the piglets at 5 to 10 weeks old than to go in for fattening. By the sowing of a small paddock of barley for greenfeed for winter and spring months and feeding with lucerne during summer, you will only have to buy a few bags of grain during the period when they are feeding their young. For this purpose I would keep Berkshire sows crossed either with Large White or Tamworth. I prefer the Berkshire sows for the reason that they are easier to keep, and either breed should give a pig that will command a ready sale. The keeping of poultry should not be neglected, the weekly sale of eggs will go a long way in keeping the house in groceries. I advocate housing, otherwise they cause a considerable amount of damage by scratching in places where they have no right to be. Eggs are one of the few things that have held their own fairly well during the depression. Vegetables for some time have been cheap; there are none cheaper than your own, therefore the time and labour spent in a vegetable garden will more than compensate for time and trouble. Generally speaking the small holder is in the same position as the wage earner. In the latter case the employer thinks for you, and the small holder must think for himself and exploit every line which shows a profit or saves money that he otherwise would have spent.''

Mr. B. Casley said that the subdividing of the farm was the main item, and that also perhaps different species of grasses could be established. Mr. G. Pannell thought that the pigs mentioned were quite suitable, and stated that they had just had a litter with the similar cross which proved to be the best pigs they had reared on their farm. He also considered meadow hay an excellent standby. (Secretary, L. Yelland.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Ashbourne	13/6/34	14	Addresses—H. H. Orchard, F. C. Richards	H. H. Pitt
Inman Valley...	19/7/34	60	Annual Social	A. Fuller
Hartley	25/7/34	9	Annual Meeting	J. Brook
Kuitpo	4/7/34	—	Address—W. N. Rule....	J. Pickup
Kuitpo	25/7/34	—	Address—M. Aird	J. Pickup
Cherry Gardens	21/7/34	12	" Phases of Rural Life," J. Blakely	A. Stone
Lenswood and Forest Range	30/7/34	9	Discussion	B. Lawrance
Yundi	18/7/34	—	Address—H. H. Orchard	T. Smart
Mount South ..	20/7/34	19	" Fallowing," W. Liebelt	C. Altmann
Hope Forest ...	3/8/34	14	Address—Mr. Nielsen ...	E. Muldoon
Scott's Bottom .	21/7/34	9	Paper—Mr. Thorpe......	E. Atkinson
Finniss	13/8/34	12	Address—M. Aird	L. Dunn
Currency Creek .	30/7/34	6	Annual Meeting.........	D. Jeff Gordon
Echunga	9/8/34	30	First Meeting	L. Walters
Monarto South .	18/8/34	25	" Working Sandy Land," J. Hartmann	C. Altmann

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	**Home Management—**	**Inter-Branch Visits**
Care of Milk and Cream	**Furniture—**	**Competitive Exhibition**
Buttermaking	**Choice**	**Flower Show**
Cheesemaking	**Repairing**	**Practical Demonstrations**
Pigs—	**Needlework**	**Social**
Bacon Curing	**Knitting**	**Music in the Home**
Beekeeping—	**Rugmaking**	**Good Reading**
Honey	**Clothing—**	**Hobbies**
Horticulture—	**Choice**	**Physical Culture**
Vegetable Growing	**Repairing**	**Labor Saving Hints**
Flower Growing	**Dressmaking**	**Spring Cleaning**
Poultry—	**Pattern Afternoon**	**Entertainment in the Home.**
Dressing	**Children—**	
Incubation	**Care and Management**	
Rearing Chicks	**Cooking—**	
Turkeys	**Recipes**	
Ducks	**Recipes for Christmas**	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

GOOD THINGS FROM THE OVEN.

[By GRACE B. ARMSTRONG, A. MARIE SCHRIEBER, and MARY A. MCPHEE, of the University of Illinois, Urbana, U.S.A.]

MISCELLANEOUS QUICK BREADS.

BOSTON BROWN BREAD.

Equipment.

1 steamer	1 measuring cup
2 moulds	1 teaspoon
1 mixing bowl	1 mixing spoon

Materials.

1 c. corn meal	2 t. baking-powder
1 c. graham flour	$\frac{1}{3}$ c. molasses
$\frac{1}{2}$ t. soda	$\frac{3}{4}$ c. sweet milk
$\frac{1}{3}$ c. raisins	$\frac{1}{2}$ t. salt

Amount: 2 small loaves.

Method.

Mix dry ingredients; add molasses and milk. Stir until well mixed; add raisins and turn into moulds or greased baking-powder cans, filling each half full. Place cover on can or tie wax paper over top of can. Steam about 2 hours, or until bread is solid. After removing from kettle, take off lids and brown the bread slightly in moderate oven (350°F.).

One-pound baking-powder tins or coffee cans make good moulds.

GINGERBREAD.

Equipment.

1 mixing bowl
1 teaspoon
1 measuring cup
1 tablespoon
1 flour sifter
1 shallow baking pan

Materials.

2½ c. flour
1 t. soda
½ t. salt
2 t. ginger
1 t. cinnamon
1 c. molasses
1 c. sour milk
4 Tb. melted fat

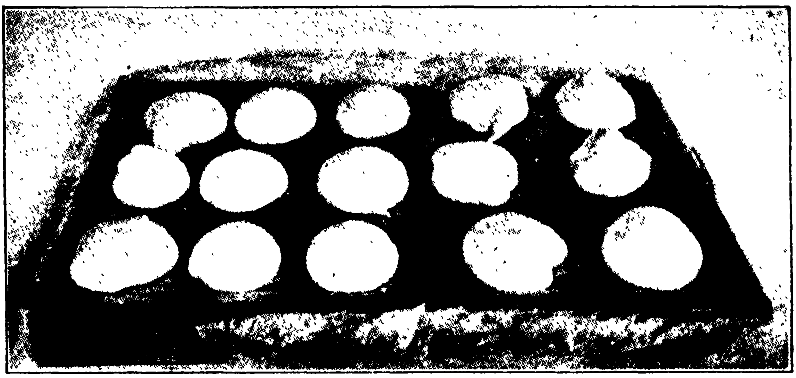


Fig. 6.—Kisses.

Amount: 12 servings.

Mix dry ingredients; put sour milk and molasses in mixing bowl and sift in the dry ingredients, stirring constantly. Add melted fat and beat thoroughly. Turn into shallow greased pan and bake about 25 minutes in moderate oven (350°F.).

Be careful about oven temperature, as any mixture containing molasses burns easily.

NUT BREAD.

Equipment.

1 teaspoon
1 mixing spoon
1 measuring cup
1 mixing bowl
1 flour sifter
1 baking pan

Materials.

1 egg
⅓ c. sugar
½ t. salt
1⅔ c. flour
2 t. baking powder
⅔ c. milk
½ c. chopped nuts

Amount: 12 servings.

Method.

Sift dry ingredients together; add beaten egg combined with milk. Beat well and add nuts. Place in well-greased pan and let rise 30 minutes. Bake 30 minutes in moderate oven (350°F.).

TYPES OF CAKE.

The foundation of all cake products is either the shortened or the unshortened (sponge) cake. There are many variations of these two types of cake. Shortened cakes are those in which the gluten of the flour has been shortened by the incorporation of fat; sponge cakes are those in which egg whites are used as the leavening agent.

SHORTENED CAKES.

INGREDIENTS.

Shortened cakes contain sugar, fat, liquid (usually in the form of milk), eggs, flavourings, flour, and a leavening agent. Nuts and fruit may be added, and various kinds of liquid and sugar may be used.

METHODS OF MIXING.

A shortened cake may be stirred or beaten, or mixed in any other way providing all the ingredients are thoroughly blended. Careless mixing results in a coarse cake; long beating gives a fine but heavy grain, while a small amount of beating makes a light and delicate texture. The *general method* and the *muffin method* are described below. The muffin method is recommended for a simple plain cake; the general method should be used for a richer cake.

GENERAL METHOD.

How.	*Why.*
Sift flour before measuring.	Sifting flour tends to separate the particles. If measured before sifting the extra amount might make the cake too stiff.
Measure and sift dry ingredients together into bowl. (Dry ingredients include such articles as flour, soda or baking-powder, salt, and spices, but do not include sugar, since sugar forms a liquid as soon as it dissolves.)	This distributes dry ingredients evenly through the flour and gives the product a finer texture. If spices are not sifted with flour, they are apt to lump when added to liquid.
Allow fat to stand at room temperature about 5 to 10 minutes before using.	If softened and then slightly creamed before sugar is added, butter or shortening can be creamed with sugar more easily and quickly.
Cream shortening and sugar together, using back of mixing spoon.	Creaming distributes fat more evenly through batter.
Break eggs one at a time into a small bowl.	One stale egg would ruin the product. When broken separately, such a loss is avoided.
Beat eggs well and add to creamed sugar and fat.	Beating eggs allows them to be more easily mixed with other ingredients. Since baking-powder is the leaven used in shortened cakes, it is not necessary to beat whites and yolks separately, although this is done when making a lighter cake.
Sift dry ingredients and add a little to this mixture; stir until smooth. Then add small amounts of liquid and dry ingredients alternately. Stir until smooth. Beat ½ minute. If whites of eggs are beaten separately, fold them in at this time.	Too much beating would develop gluten and make the product tough.

GENERAL METHOD—*continued.*

How.	*Why.*
Pour into greased baking pan; fill only ½ to ⅔ full. Use spatula or spoon to scrape out bowl.	If pans are only partially filled, the cake can rise without overflowing.
When filling pans, gently press batter into the corners, making centre slightly lower than sides.	A more evenly shaped cake results because the cake tends to rise more in the centre than on the sides.
Bake in moderate oven (375°F.). (Follow general directions given below for baking shortened cakes.)	A better shape results if the cake is allowed to rise before a crust is formed over the top. Products with sugar in them tend to burn easily.
After removing from oven, allow cake to stand in pan for 5 or 10 minutes.	After steam has caused the cake to loosen from the pan, it can be removed without injuring its shape.
Remove cake from pan and place it on wire rack or clean white paper to cool, but avoid drafts.	A current of air will dry out the cake.
Keep in ventilated tin box.	A tin box will keep cake from drying out. Ventilation is needed, however, to prevent cake from getting mouldy.

MUFFIN METHOD.

A plain cake may be made by the muffin method, which is a time and labour saver. Sift all dry ingredients together; combine liquid, beaten eggs, and melted fat. Mix the two together. Beat about ½ minute. Egg whites and yolks may be beaten separately and whites added at the last as in the general method.

BAKING SHORTENED CAKES.

The baking of the cake might well be said to be the most important part of the entire process, since so much of the success of the cake depends upon it. Be sure that the oven is the right temperature for the type of cake to be baked (refer to *Oven Temperatures*, page —).

Do not try to bake more than one kind of cake in an oven at the same time, since different types require different treatment. A small cake and a layer cake require a hotter oven than a loaf cake, because they must bake quickly before drying out. A large cake or a loaf cake must bake more slowly so that the heat may penetrate to the centre before too hard a crust is formed on the outside.

Place the cake as near the centre of the oven as possible, as this gives a more even distribution of heat and insures more even rising.

The baking of a cake is divided into four quarters. During the first quarter the cake begins to rise; during the second quarter it continues to rise and begins to brown; during the third quarter it finishes rising and continues to brown; during the fourth quarter it finishes browning and shrinks from the pan. The cake should not be moved while baking, since a jar causes the fragile cell walls to break; the leaven then escapes, and the cake is likely to fall. If it is baking unevenly, it may be moved with least danger during the first and last quarters, but should not be moved just after the crust has begun to form. Open and close the oven door very carefully. If the oven if too hot, lower the heat or place a pan of cold water in the oven. If the cake is browning too fast, put a paper over it, but be careful that the paper does not stick to the cake.

When done, the cake shrinks from the pan; pressed gently on top with a finger, it springs back and leaves no indentation. If baked too slowly, the cake may rise over the sides of the pan and be of a coarse texture. When put in too hot an oven, the cake forms a brown crust on top before it has risen sufficiently; then rising more, it is likely to break through the crust and make a badly-shaped loaf. The oven temperature should be kept as nearly uniform as possible.

Do not open the oven door frequently to look at a cake. Be sure of the oven temperature before putting the cake in, then open the door only once or twice during the entire baking.

Cakes containing such substances as dried fruits, molasses, or chocolate tend to burn quickly, and must be baked at a slightly lower temperature than a plain cake.

SUCCESS OR FAILURE IN CAKE MAKING.

Recognition of the causes of success or failure in cake making gives one assurance, and makes more uniform results possible. A few of the general causes of success or failure are given below. Consider the finished product, judge it, and let your observations be a guide to greater success.

SUCCESS DEPENDS UPON:—

A well-proportioned recipe.
The use of fresh and well-flavoured ingredients.
Careful measuring and mixing of ingredients.
Careful baking with right oven temperature.

FAILURES AND THEIR CAUSES:—

A heavy product or the falling of a cake may be due to—

Too slow an oven.
Too much sugar or fat, or both.
Too little flour.
Moving the cake in the oven or jarring it before it is set.

A coarse-grained product may be due to—

Too slow an oven.
Too much leaven.
Careless mixing of ingredients.

"Bready" appearance and cracks on top may be due to—

Too much flour.
Too hot an oven at first.

Uneven rising of the product may be due to—

Cake being placed near one side of the oven.
Oven being too hot on one side.
Too much flour.

Rough edges may be due to—

Too much sugar.
Too much shortening.
Too little flour.

PLAIN LOAF CAKE.

Equipment.

2 mixing bowls	1 teaspoon
1 small bowl	1 flour sifter
1 measuring cup	1 egg beater
1 mixing spoon	1 loaf pan

Materials.

⅓ c. butter	1½ c. flour
⅔ c. sugar	¼ t. salt
2 eggs	2 t. baking-powder
½ c. milk	

Amount: 1 loaf cake 3in. x 3½in. x 8½in.

Method.

Use either general or muffin method for mixing shortened cakes. Bake in moderate oven (350°F.) 45 minute to 1 hour.

LAYER CAKE.

Equipment.

Same as above except layer cake pans instead of loaf cake pan.

Materials.

Same as for plain cake.

Amount: 3 round layers 9in. in diameter.

Method.

Use either general or muffin method for mixing shortened cakes. Bake in moderate oven (375°F.) 25 to 35 minutes.

STANDARD CAKE.

(1-2-3-4 Cake.)

Equipment.

Same as for layer cake.

Method.

1 c. butter
2 c. sugar
1 c. milk
4 eggs
1 t. flavouring
3 c. flour
4 t. baking-powder

Amount: 2 loaf cakes 3in. x 3½in. x 8½in., or 4 round layers 9in. in diameter.

Method.

Use general method described for mixing cake. Bake loaf cake at 350°F. and layer cake at 375°F.

JELLY ROLL.

Equipment.

1 mixing bowl
1 small bowl
1 mixing spoon
1 tablespoon
1 teaspoon
1 flour sifter
1 measuring cup
1 egg beater
Oiled paper or clean wrapping paper
1 shallow dripping pan

Materials.

3 eggs
1 c. sugar
½ Tb. milk
1 c. flour
1 t. baking-powder
¼ t. salt
1 Tb. melted butter
Jelly stirred or mixed thoroughly

Amount: 1 jelly roll 12in. x 6½in.

This proportion of eggs to flour makes a tough product which can be rolled without breaking. A larger proportion of shortening and liquid would make the product too tender to roll.

Method.

How.	*Why.*
Line bottom of dripping pan with paper. Grease paper and sides of pan.	Paper makes it possible to remove a thin cake from pan without breaking edges of cake.

METHOD—*continued.*

How.	*Why.*
Beat eggs until light. Gradually add sugar, then milk.	Eggs serve as part of liquid to dissolve sugar.
Sift and add dry ingredients. Put in melted butter.	Butter blends better with other ingredients if added last.
Spread mixture evenly over bottom of pan. A fairly large pan should be used so that cake will be only about ¾in. thick when baked.	A thicker cake is likely to crack when rolled, and a thinner cake dries out before it is sufficiently baked.
Bake 15 to 20 minutes in slow oven (300°F.). Meanwhile stir jelly to spreading consistency.	Too hot an oven makes the cake hard and crusty. Over-baking dries it out.
Take cake from oven, loosen edges, reverse pan, and allow cake to fall out on a paper sprinkled with powdered sugar.	The moist underside of the cake is thus placed uppermost, while the seared surface is at the bottom and is covered with sugar. Sugar helps to make the roll stick together and also makes an attractive finish.
Quickly remove paper which has lined pan and now adheres to cake.	Unless removed quickly, paper is likely to stick to cake.
Cut off a thin strip of cake from sides and ends.	This crusty part would crack if rolled.
Spread a moderate amount of stirred jelly or jam over cake.	If too much jelly is used, it will soak in and make the product soggy.
Everything should be ready for rolling when cake leaves the oven, for this entire process must be done quickly.	If cake is allowed to cool, it will dry out somewhat and tend to crack in rolling.
Roll up cake quickly and fasten paper about it. Be careful not to press or roll too tightly. When cooled slightly, remove paper.	Paper will keep the roll in shape until it has cooled, when it will retain its shape without being held in place.

NUT CAKE.

Prepare plain cake recipe (see page —), using ¼ cup of butter and ½ cup of walnut or hickory nut meats ground or chopped fine instead of ⅓ cur butter. The nuts should be added last. If they are in large pieces, it it necessary to flour them and to use 1 tablespoon more of fat.

GOLDEN SPICE CAKE.

Equipment

1 mixing bowl	1 mixing spoon
1 measuring cup	1 egg beater
1 teaspoon	1 grater
1 flour sifter	1 loaf pan

Materials.

½ c. shortening	½ c. brown sugar
½ c. molasses	½ c. milk
1 egg	4 egg yolks
2¼ c. flour	1 t. baking powder
½ t. soda	½ t. cloves
1 t. cinnamon	½ t. grate lemon rind

Amount: 1 loaf cake 3in. x 3½in. x 8½in.

Use general method for mixing cake (see page —). Bake in moderate oven (350°F.) about 45 minutes.

Apple Sauce Cake.

Equipment.

Same as for golden spice cake except for addition of sieve.

Materials.

1 c. sugar	2½ c. flour
½ c. shortening	1 t. soda
1 c. apple sauce (unsweetened and consistency to pour)	1 t. cinnamon
	¼ t. cloves
	¼ t. nutmeg
	1 c. raisins.

Amount: 1 loaf cake 8½in. x 3½in. x 3in.

Method.

Cook apples until very soft; then put them through a sieve Do not sweeten. The sauce must be in a smooth, fine condition or a coarse-grained cake will result. Clean raisins. Use either general or muffin method of mixing (see page). Apple sauce is added in place of other liquid. Bake in slow oven (325°F.) about an hour. Keep in a covered tin box. This cake, while inexpensive, has the qualities of very rich fruit cake, and will keep moist for some time.

Dark Fruit Cake.

Equipment.

1 mixing bowl	1 mixing spoon
1 measuring cup	1 egg beater
1 teaspoon	1 knife or food chopper
1 flour sifter	1 loaf pan

Materials.

½ c. butter	½ t. allspice
¾ c. brown sugar	½ t. mace
½ c. molasses	¼ t. cloves
½ c. milk	½ t. lemon extract
2 eggs	¾ c. raisins
2 c. flour	¾ c. currants
½ t. soda	½ c. citron thinly sliced and cut in strips
1 t. cinnamon	

Amount: 1 loaf cake 8½in. x 3½in. x 3in.

Method.

Clean dried fruit. Chop raisins with knife or put them through a coarse food chopper. Cut citron rather fine. Reserve about 3 tablespoons of flour with which to flour the fruit.

Prepare according to general directions (see page 34). Flour the fruit and add last, stirring the mixture well to be sure that the fruit is well distributed. Put in a deep pan and bake about 1¼ hours in slow oven (300° F.). Be sure the cake is thoroughly done. The more fruit used, the longer the time required for baking. Slow baking avoids burning, and allows the fruit flavour to penetrate the entire cake. A cake of this kind will keep a long time, and has a better flavour a few days after baking. Since it is very rich, small servings should be given.

Devil's Food Cake.

Equipment.

1 double boiler	1 egg beater
1 measuring cup	1 mixing bowl
1 teaspoon	1 or 2 loaf pans
1 flour sifter	

Materials.

(1) ¼ cake bitter chocolate
1 c. sugar
¾ c. sweet milk

(2) 1 c. sugar
⅔ c. butter
¾ c. sour milk (clabbered)
1 t. vanilla
3 eggs
1 t. salt
1 t. soda
2 t. baking-powder
2⅔ c. flour

Amount: 1 loaf cake 10in. x 6½in. x 2in., or 2 loaves 8½in. x 3½in. x 3in.

Method.

How.	*Why.*
Melt chocolate in top of double boiler or in dish placed over hot water.	Chocolate should melt slowly so that it will have a smooth consistency and will blend well with other ingredients.
Remove from over hot water and add sugar to melted chocolate. Stir well.	If chocolate remains over heat after melting, it becomes thick as a result of the cooking of the starch in the chocolate and the separation of fat from other substances and does not mix well with other ingredients.
Add milk slowly, stirring constantly.	Milk dissolves sugar and makes a liquid which can be beaten into cake batter easily.
Allow to stand until Part 2 is prepared. Prepare Part 2 according to general method for mixing cake (see page).	
When Part 2 is thoroughly mixed, add Part 1 and beat only until the 2 batters are well blended.	An even colour and texture result from thorough mixing.
Bake as a loaf cake in moderate oven (350°F.) for 40 minutes to 1 hour, depending on shape and size of loaf.	If cake is thick, it will require a longer time for baking.

If cocoa is used instead of chocolate, it may be sifted with the flour or mixed with the sugar, the sugar and milk of Part 1 may be added to Part 2, and the amount of flour called for reduced by ½ cup. Three tablespoons of cocoa is equivalent to 1 square of chocolate.

(To be continued.)

[Next month's issue will deal with Cookies.]

KYBYBOLITE (Average annual rainfall, 22in.).
May 8th.—Attendance, 19.

DOMESTIC ECONOMY.—Paper contributed by Mrs. P. Laurie:—"In these days of lessened incomes we are obliged to economise very considerably in the work and management of the home, and in that way do our part in helping our men folk to meet the needs of the present time. I propose to give some suggestions and also a few recipes that are most suitable for the country housekeeper.

Houshold Soap.—At the present time and for some time past tallow has been very cheap, so there is an abundance of it which can be made into soap with very little trouble. These two recipes are reliable. The first is excellent for household and laundry work and is not hard on the hands:—½ kerosene tin rainwater, 5lbs. fat, ¾lb. resin, boil for about 10 minutes. Lift off fire and add 1 tin caustic soda very gradually, 1 handful of borax, ½ cup cloudy ammonia. Boil all togther steadily for 2½ hours. The second one is a little more expensive and slightly more trouble:—6½lbs. fat

—free from salt—2galls. water (except 2 pints), ½lb. resin, 2 tablespoons each of borax, rock ammonia, and olive oil, 1 large pkt. lux. Mix and boil until all are dissolved, then add 1lb. caustic soda dissolved in 2 pints of water; mix slowly. Boil all for 2 hours or more; take off fire and add ½ cup each of kerosene and petrol. In the other recipe I used the same amount of kerosene and petrol after taken off fire. It is necessary to leave it for several weeks before cutting it up into small pieces; this prevents it from shrinking.

Porridge made from Wheat.—Wheat is only a few shillings a bag now, and a grain-crusher can be bought for about 15s. Where there are growing children in households who are fond of porridge the little grister will pay for itself in a very short time. See that the wheat is free from husks, then put it through the grinder. I have had mine for about three years and always have it in use right through the winter, as we use a lot of wholemeal for biscuits and other cooking as well as for porridge.

Preserving Eggs.—Eggs are best kept in a basket. If held up to the light an egg if fresh should be clear, if thick it is stale. Eggs are most plentiful and cheapest in the late spring. They may be preserved for future use by rendering them airtight to prevent decomposition. The simplest treatment is to coat them thoroughly with lard or mutton fat, then pack them in a wooden box well perforated with holes and standing off the ground a few inches to allow for the circulation of a good current of air. Another way is to pack them in salt, narrow ends downwards, after having greased them.

To Dry Fruit.—*Prunes*: To 4galls of water add 1 teaspoon of caustic soda and bring the water to the boil. Have the plums ready in a sugar bag, hold the mouth of the bag in one hand and immerse the bag with the plums in the boiling water while you count 10—not longer or the plums will burst. Then turn the fruit out on trays in the sun until dry, which will take about a fortnight. *Apples*: Peel, core, and slice the apples. Have a large bowl of salted water ready (not too salt) and put them in as soon as they are ready. This is to keep them a nice colour, then drain for a little while, and turn on trays in the sun until dry. *Apricots, Peaches, Pears, &c.*, can be done by halving them and taking out stones. A good way to dry all fruit is to have a long rather narrow wooden frame and tack close-mesh wire-netting to it. Turn the fruit on to this and place it on trestles in the sun. If the weather is good, put it out in the morning and always bring in at night. The wire-netting allows the air to get underneath and so dry the fruit quicker and more thoroughly. When storing away, put in new unbleached calico bags—ones that have not been washed—sprinkling a little sulphur amongst the fruit; this will keep all weevils away.

To Clarify Fat.—This is an excellent way in which one can always be sure of good soft mutton fat. Boil the fat with water until all the water has boiled out of it, then turn it out. This will keep indefinitely and will not go rancid.

A Permanent Blacklead.—Try mixing a cake of blacklead with an equal weight of bluestone crystals. Mix to a paste with cold water and apply to the stove with a brush. The heat will bake the surface to enamel brilliance, and with an occasional brush up the treatment should last for months.

A Substitute for Starch.—If you run out of starch, ordinary flour will do very well made in the same way as starch and with a small lump of butter added to it.

To Mend a Lace Curtain.—If there is a hole in a lace curtain or any net or thin curtain, match the pattern with some of the scraps of the materials and just stick it over the hole, ironing smoothly with starch. It will make a much better job than mending it, as the patch will not be seen at all.

Floor Polish.—This is a very good polish for either furniture or floors and is not too slippery, and is reliable for restoring a polished surface—1oz. shredded beeswax, ½oz. each shredded white wax and shredded soap, ½pint each turpentine and boiling water. Melt the waxes in a tin, add the soap dissolved in boiling water, then the turps (off the fire). Stir occasionally until the mixture is a white cream, bottle in a wide necked bottle and keep corked.

French Polish.—2ozs. shellac, 1oz. gum mastic, 1 pint methylated spirits. Crush the gums, sift through muslin, dissolve slowly over gentle heat, add the spirit, bottle and cork at once. Put a piece of cotton wool saturated with this polish on linen, doubling it over to form a pad, and then polish, every movement being in a circular direction. Much energy, time, and patience are necessary to obtain a pleasing result.

To Remove Stains.—Ink may be removed by gently rubbing in milk that has been boiled but is somewhat cooled, changing the milk as soon as it becomes discoloured. Wet ink on white material should be rubbed with a piece of lemon as soon as the ink is soaked up, rinse quickly and repeat if necessary. *Wine and Fruit Stains*: While wet sprinkle salt on the spot, pouring boiling water through, or soak the stain for a few minutes in boiled milk. *Tea and Coffee Stains*: These should be attended to while wet. Spread the stained part over a basin and pour boiling water through until marks disappear. *Iron Mould*: Pour boiling water through yellow mark, lay on it a pinch of salts of lemon, then pour boiling water through again. Repeat this as an old mark is usually very obstinate.

Washing the Floor.—There is a certain amount of kerosene in the composition of linoleum, so when washing the floor, be sure to use a little kerosene in the water to preserve the linoleum and considerably lengthen its life.

For Scouring Pots, &c.—Melt down a bar of home-made soap and stir in as many sifted ashes as it will take, put into tins. This is very good for cleaning aluminium ware.

The Care of Beds.—The Mattress: In this climate wire mattresses are apt to rust in winter; it is a good plan to paint them with aluminium paint to protect the bedding from rust. Then if you make a case of unbleached calico—like a big pillow case with tapes at one end and just slip it over the mattress—it will prolong its life considerably. Have a covering over the pillows also in addition to the pillow case to save the ticking. Very nice coverings for children's beds can be made from any scraps of old blanket or woollen material of any kind, spread out and tacked on to thin calico, then covered with a suitably coloured washing cretonne or chintz. They are beautifully snug and warm and take the place of about two blankets. *To Wash Blankets*: Half a bar soap cut finely. Pour over it 1 pint of boiling water, put on the fire and stir until a thick paste. Mix into it 2 tablespoons of ammonia. Have ready a copper of tepid water softened with 1 tablespoon of borax, stir in the mixture, then put in the blankets. Let soak 1 hour, turning them over frequently, and be sure to keep the water warm, not hot, a few sticks under the copper will do this. Then run through the wringer and rinse in clear tepid water; no rubbing. (Secretary, Mrs. Kekwick.)

June 26th.—Attendance, 17.

POULTRY.—Paper read by Mrs. C. Hann:—"We are not in a favourable situation so far as markets are concerned, to make poultry farming by itself a payable proposition, being in a cold district and a long way from the market. It is my intention to deal with this subject mainly as a sideline on the farm. Most farms try to produce eggs without too many of the modern conveniences. When starting with poultry, select pure bred foundation stock and always keep the breed pure. Do not cross different breeds. Most people have a preference for a certain breed, and the person with a preference for a certain breed will get more out of those fowls than from a breed they do not like. Any of the recognised laying strains will give good results provided they get the right treatment. Having chosen the breed and strain of fowls the next important point to consider is the number you intend to keep. Do not keep 200 fowls if you only have accommodation and feed for 100. Fifty good fowls, well looked after, will give more eggs than 200 badly housed and half fed. On most farms fowls have free range and pick up quite a lot of their own feed. The house should be built in a well sheltered position facing the east, be well ventilated, and free from draughts. For 50 fowls a house 12ft. x 12ft. x 6ft. high or higher is necessary. Always give plenty of room on the perches and always have all perches on the same level, otherwise the fowls will always crowd the higher perches. It is essential to have some small yards and houses in which to keep breeding fowls during the breeding season, to keep cockerels separate from the hens and to use for fattening any others for market. See that everything is kept clean; houses, water and feed troughs should be cleaned and disinfected at least once a week. All nests should be kept clean, and on no account should the fowls be allowed to roost in the nests. The most troublesome pests are tick, lice, and red mite. See that there is a good dust bath available for the fowls. This can be kept dry in a corner of the house. The bath should consist of wood ashes with a handful or two of lime in it. If this is provided the fowls will disinfect themselves. As most of these pests live in the woodwork and crevices of the house and perches it is necessary to attack them there. To destroy these pests it is necessary to saturate occasionally all woodwork inside the house and nests with kerosene or sump oil. Another important item is selecting the breeding pen. Remember that the cockerel is very important, he represents practically half the breeding pen. Too many farms allow a half dozen cockerels of their own breeding to run with their flock of hens and pullets and set the eggs from their bulk collection. By this method they are soon bound to deteriorate instead of improve their flock. Having selected or bought a good cockerel select hens for the breeding pen carefully. Select second year or other hens that are active and true to the type you are breeding—usually the first off the perch in the morning and the last on the perch at night; the pen that is always scratching and looking for work is the one that produces the eggs. Never breed from pullets if you have hens available, the chicks are usually weak and hard to rear, and do not mature as quickly as from older hens. It does not pay to keep hens for egg production after their second season. Always try and hatch chickens so that the pullets will commence to lay about March or April when the older hens are going into moult. Allow about five months for light breeds—Leghorns, Minorcas, &c.—and six to seven months for heavy breeds such as Orpingtons, &c. Get rid of the cockerels as soon as they are fit to go on the table; it does not pay to have them eating the feed from the hens. It usually pays to separate the cockerels from the pullets as soon as you can distinguish the sex. Force the cockerels along to get rid of them early. ***Feeding:***

Fowls should be fed twice a day in winter when there is plenty of greenfeed and they have free range, but if they are penned it is essential that they get greenfeed at midday. The flock on range should have greens during summer to keep them healthy. Fowls should be given mash in the mornings, consisting of bran 2 parts and pollard 1 part, usually the bran is scalded with hot water or mixed with separated milk and then dried down with the pollard so that it is crumbly and fed in troughs. A little meat meal should be added if there is no other meat available for the fowls. The right feed should consist of grain, preferably wheat, or a mixture of grains thrown on the scratching litter. Fowls, particularly if penned, must have exercise, and the surest way of giving them this is to have about 6in. of straw in the yard on which to throw the grain. I can get twice as many and better eggs from my breeding pens if I keep them well supplied with scratching litter. A recent authentic Government test also proved that feeding mash, greenfeed, and grain against grain increased the egg yield by from 50 to 80 per cent., in some cases more. In hatching, the incubator and broody hen are both used; the hen is certainly the least trouble, but it is usually late in the season before you can get your number of chicks hatched and then the trouble occurs that there are not any eggs when the hens go into the moult. Turkeys usually set fairly early and make good mothers. Chicks should be kept warm, given plenty of cracked grain, hulled oats, bran, or bread crumbs, with greenfeed chopped very fine, also provide shallow clean water tins and keep them filled. A few "don'ts":—

Don't expect the maximum if you only supply the minimum.
Don't expect fowls to keep warm during winter roosting in a gum tree.
Don't forget to gather all eggs regularly.
Don't forget, infertile eggs will keep longer than fertile.
Don't forget to keep drinking water clean and cool and in the shade.
Don't bother with weakly chicks, weak chicks never make good hens.
Don't forget it pays to produce large eggs of good quality.
Don't try and run 100 hens if you are only going to buy enough for 50.
Don't be satisfied with anything but the best. (Secretary, Mrs. Kekwick.)

MANGALO (Average annual rainfall, 14in. to 15in.).
July 12th.—Attendance, 15.

Mrs. R. Crittenden read a paper, "Care of Baby."

HOUSEHOLD HINTS.—The following were supplied:—(Mrs. A. J. Hissey) When making bread in winter it will rise more quickly if placed in an open fireplace, which has contained a fire the night before. If when washing greasy pans they are first wiped out with a piece of newspaper, they are more easily washed and it will prevent the dishcloth and water from becoming greasy. When sewing, if any turnings are pressed down with a warm iron, they remain flat and are easier to handle. Eucalyptus will remove grease from any article without damaging colour or fabric. (Mrs. H. Klingberg)—When mending stockings, always run the hole around the edge first; this makes the edges flat and draws the hole together, making it easier to darn. Fried eggs will not break or stick to the pan if a little flour is added to the frying fat. A teaspoonful of ammonia added to a bowl of warm water removes fruit stains from fingers. To clean the copper, put the dirtiest soapsuds in it after the day's washing and leave for two days, then empty and the copper will be shiny. Alum can be used very effectively for mending broken china, glassware, &c. Melt a little in an old iron spoon, apply it to the broken parts and leave until it hardens. A small piece of alum added to vinegar when pickling helps to make pickles nice and crisp. (Mrs. P. Cleave)—Oil and eucalyptus applied instantly to a burn will prevent a blister and relieve the pain. Eucalyptus if immediately applied to a cut or scratch will cleanse the wound and stop the bleeding. Before washing new cotton, allow the material to soak in cold water in which a little Epsom salts or salt has been added. If before washing new sheets or men's denims, they are allowed to soak in cold water into which common salt is added they will be soft and easy to wash. (Mrs. A. E. Lathlean)—When the top thread of the sewing machine constantly breaks, reverse the needle. When tea has been spilt on a cloth, sprinkle a little sugar on the stain and thus prevent the stain from setting. Paint can be removed from clothes with a solution of ammonia and turpentine. (Miss J. James)—A teaspoon of lemon juice in a small cup of black coffee is almost certain to relieve a bilious headache. Mildew may be removed from leather goods by rubbing first with vaseline then a soft cloth. Soak cabbage or cauliflower in water with a little vinegar and it will remove the insects quicker than if salt is used. (Mrs. T. Coles)—If the teapot is changed every few months the tea will taste fresher and nicer. When making a sponge, put the baking dish with the eggs and sugar in it into a dish of boiling water. They will beat up in less than half the time. When dusting, put a little kerosene on the duster. It takes up the dust much better. Before washing greasy dishes, scrape them thoroughly with an old bendy knife. The task seems much easier then. If carpets or mats look dirty, rub cloudy ammonia over them and it will brighten them. Before knitting socks or infants clothes shrink the wool by soaking it in some water. After unpicking a knitted article wind the wool into skeins around two chairs and soak it in some warm soapy water. When dry the wool will be like new wool. (Secretary, Mrs. F. Cole.)

McLAREN FLAT.

June 7th.—Attendance, 19.

RECIPES FOR AFTERNOON DAINTIES.—*Three Minute Sponge* (Mrs. S. Elliott): 2ozs. butter, ¾ cup sugar, 1 cup plain flour, 2 level teaspoons cream tartar, 1 teaspoon carb. soda, about 4 tablespoons milk, 3 eggs. Warm butter slightly, put all together in a basin, and beat 3 minutes only. Bake 10 to 15 minutes only in moderate oven. *Orange Cream Cakes*: 2ozs. butter, 4ozs. sugar, 2 eggs, 3 tablespoons milk, 8ozs. flour, 2 oranges, whipped cream. Cream butter and sugar and eggs, well beaten, then milk and flour and grated rind and juice of lemon. Mix well and bake in containers. Decorate with whipped cream and orange slices. *Sultana Olives* (Mrs. J. E. Bruce): Chop some olives and gherkins very fine and mix with cream cheese, season to taste, place 1 teaspoonful on a buttered sultana cracker biscuit. Garnish with small pieces of gherkins and stuffed olives. *Anchovy Cheese*: Butter a small cheese biscuit, place a ring of hard white boiled egg upon it; in centre of ring place a small curled anchovy. Sprinkle with a little pepper. Garnish with chopped egg yolk. *Sponge Lilies* (Mrs. Sigston): ¼lb. each sugar and flour, 2 eggs, ½ teaspoon baking powder. Mix as for sponge, drop from a dessertspoon on to buttered tray. When lightly brown and while hot, roll into shape like a lily, fill with whipped cream. *Chocolate Dainties* (Mrs. Bick Elliott): Beat 4ozs. butter and 4ozs. sugar to a cream. Add 2 well beaten eggs, sift in 4ozs. S.R. flour, 2ozs. cocoa, add 2 tablespoons milk, bake in patties in a moderate oven 10 to 15 minutes. When cool cut the centre and fill with cream filling flavoured with vanilla, put top on again and sprinkle with icing sugar. *Cream Puffs* (Mrs. Sigston): 2ozs. each butter and flour, 2 eggs, 5 tablespoons water. Bring water and butter to boil in saucepan, stir flour in gradually, cook for about 5 minutes, stirring all the time into a smooth paste, allow to cool, then break in eggs, one at a time, and beat well. Drop in small spoonfuls on greased tray. *Cream Cakes*: 2ozs. butter, 4ozs. sugar, 2 eggs, 4ozs. S.R. flour, flavouring to taste. Bake in moderate oven for 10 minutes. *Chocolate Dominoes*: Make sponge mixture by beating 2ozs. butter, 3ozs. sugar to cream, add 2 eggs, well beaten, 4ozs. flour, ½ teaspoon soda, 1 teaspoon cream tartar (sift flour, &c., 3 times), beat well together and pour into square tin and bake about 20 minutes. Cover with

1934 CALENDAR 1934

MAY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	●	30	31	...	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	●	28	29	30
...	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	...	...	...	...	...	...
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	●	27	28
29	30	31	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	●
26	27	28	29	30	31	...
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
●	24	25	26	27	28	29
30	...	...	...	...	...	...

OCTOBER

S	M	T	W	T		S
...		2	3	4	5	6
7		9	10	11	12	13
14		16	17	18	19	20
21		●	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	●	22	23	24
25	26	27	28	29	30	...
...	...	...	...	...	...	...

DECEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	●	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

chocolate icing, and when set cut into domino shape, as near as possible, and put dots on with royal icing. Royal Icing: 1 tablespoon icing sugar, lemon juice, and beat with a little white of egg until stiff. *Naugat Seeaps* (Mrs. H. G. Air): Mix ½ cup rolled oats, ¾ cup S.R. flour, and 1 cup sugar. Dissolve 1 tablespoon honey or golden syrup in 2 tablespoons boiling water and stir in dry ingredients. Lastly stir in 1 teaspoon carb. soda in 4ozs. butter (melted). Mix well and allow to stand for a while to let the oats swell. Drop teaspoonful on greased tray. Keep far apart and when cooked leave on tray until cool. *Piquant Dainties*: Boil 2 eggs until very hard, shell and cut into halves lengthways. Take out yolk and eggs and mix in a basin with a small teaspoon each of tomato sauce and Worcester sauce. Pepper and salt to taste. Mix to a paste, cut white of eggs lengthways, to make boat shape pieces. Place on savoury dainty biscuits, or any other biscuits that will take the boat shape eggs, fill with the yolk mixture. Make a hole in centre with a small piece of lettuce, nice and crisp, to make it look like a sail on a boat. Garnish with small pieces of pimento. *Cream Puffs* (Miss R. Elliott): 1 cup hot water, ½ cup butter, boil together, and while boiling stir in one cupful of dry flour. Take from the stove and stir to a smooth paste. After this cools, stir in 3 eggs not beaten, stir 5 minutes. Drop in tablespoons in a buttered tin, and bake in a quick oven for 25 minutes. Do not let them touch each other, and do not open the oven door more than is absolutely necessary. *Mock Cream Filling* (Miss R. Elliott): Boil 1 cup milk, thicken with 1 tablespoon cornflour, and allow to cool. Beat 2ozs. each butter and icing sugar to a cream, add first mixture a little at a time, until used up, beating well all the time, flavour with vanilla. (Secretary, Miss S. Nicolle.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Belalie	10/7/34	29	"Home Nursing," Mrs. M. Baily	Mrs. E. Orchard
Coonawarra	18/7/34	18	"Dried Fruit," Mrs. E. Allder	Mrs. F. Skinner
Coonawarra	19/6/34	33	"Needlework," Miss F. Moore	Mrs. F. Skinner
Laura Bay	12/6/34	12	"Washing," Miss R. Blumson	Mrs. D. Morrison
Warramboo	6/7/34	14	"Hand Crafts," Mrs. D. Oswald	Mrs. A. Steer
Rendelsham	6/6/34	15	"Winter Puddings," Mrs. F. Todd	Miss P. Foster
Rendelsham	1/8/34	9	Question Box	Miss P. Foster
Williamstown	4/7/34	7	Annual Meeting	Mrs. A. Cundy
Yurgo	21/6/34	—	"Early Days in the Mallee," Mrs. H. Kelly	Mrs. R. Sanders
McLaren Flat	26/7/34	21	Address—Miss E. Campbell	Miss I. Nicolle
McLaren Flat	2/8/34	200	Annual Social	Miss I. Nicolle
Morchard	28/6/34	100	Annual Social	Mrs. C. Schulz
Morchard	25/7/34	15	"Buttermaking," Mrs. Tillbrook	Mrs. C. Schulz
Warcowie	19/7/34	50	Annual Social	Mrs. A. Crossman
Kangarilla	19/7/34	9	"Fancywork," Miss H. Paddick	Mrs. M. Steer
Parrakie	24/7/34	14	Paper—Mrs. E. Herbert	Miss J. Halliday
Penola	1/8/34	33	Annual Meeting	Mrs. E. Kidman
O'Loughlin	22/7/34	10	"Sport for Women," Miss V. Kloeden	Mrs. A. Pfeiffer
Clare	4/8/34	31	Exchange of Plants	Mrs. F. Pollock
Mundalla	29/7/34	12	Address—A. L. Warren	Miss M. Scown
Balumbah	1/8/34	15	Social Afternoon	Miss H. Jericho
Warramboo	3/8/34	10	Discussion	Mrs. A. Steer
Saddleworth	7/8/34	11	Annual Meeting	Miss G. Frost
Williamstown	1/8/34	8	Discussion	Mrs. A. Cundy
Wasleys	2/8/34	54	Cooking Competition	Miss J. Braun
Laura Bay	14/8/34	—	Exhibition and Competition	Mrs. R. Burke
Balumbah	15/8/34	7	Discussion	Miss H. Jericho
Tantanoola	1/8/34	9	Question Box	Mrs. E. Telfer
Taplan	15/8/34	26	Annual Meeting	Mrs. P. Flynn

// THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA

VOL. XXXVIII. OCTOBER, 1934. No. 3.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Fruit (Non-irrigated Districts), at Balhannah, Tuesday, November 6th, C. G. Grasby (Secretary).

The Conference will commence at 10.30. Members of Branches are invited to submit papers and questions for the agenda.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held as follows:—

Murray Bridge, Thursday, October 25th.

Woodside, Saturday, November 3rd.

Linseed Meal for Horses.

Mr. C. McKenna, B.V.Sc., Stock and Brands Department, advised delegates from the Lameroo Branch at the Pinnaroo Line Bureau Conference that for a draught stallion weighing 15cwt. which is travelling during the season, the following daily ration is recommended:—Good quality oaten chaff, 20lbs.; oats, 9lbs.; bran, 4lbs.; linseed meal, 3lbs. For working farm horses of an average weight of 1,200lbs. for light draughts to 1,400lbs. for draughts, suitable rations would be:—

(*a*) For medium work, *e.g.*, ploughing: Good quality wheaten or oaten chaff, 17-19lbs.; oats, 7lbs.; bran, 3lbs.; linseed meal, 1lb.

(*b*) For heavy work, *e.g.*, binder: Good quality wheaten or oaten chaff, 17-19lbs.; oats, 11lbs.; bran, 4lbs.; linseed meal, 1lb.

Lower North Pruning Competitions.

The report of the Lower North Pruning Competitions—Langdon Parson's trophy—which appeared on page 103 of the August issue records the name of A. Hentschke with 530½ points—this should be A. Andriske. C. A. Hoffman who scored 543 points was omitted and is the next to highest competitor.

Pasture Competitions.

Successful livestock management is very largely dependent upon the provision of satisfactory pastures, and in order to draw attention to the best pasture types and the methods by which such pastures were brought to the maximum degree of production, pasture competitions for various districts were commenced by the South Australian Committee of the Australian Dairy Council in 1932.

This season it has been decided to hold the competitions in four (4) districts, namely, Hills (over 22in. rainfall), South-East (over 22in. rainfall), irrigated areas and all districts with under 22in. annual rainfall.

Pasture entries must not be less than five acres in area, with the exception of the irrigated areas, and in this case the area must be not less than two acres. In judging, points will be allowed according to the area of pasture submitted.

Prizes are offered in each district, consisting of trophies to the value of £3 3s., £2 2s., and £1 1s., together with Certificates. A fee of 1s. will be charged for each entry.

Competitors will be asked to state clearly in their applications—(*a*) location of the pastures, (*b*) area of the pastures.

Entries are due with the Secretary of the Committee not later than Thursday, November 1st, 1934, and are restricted to dairymen milking at least seven (7) cows. Forms may be obtained from the Secretary, South Australian Committee of the Australian Dairy Council, office of the Minister of Agriculture, Flinders Street, Adelaide.

The Relative Food Value of Crushed Wheat and Oats when Fed with Cocky Chaff?

Replying to this question which was submitted at the Conference of Pinnaroo Line Branches of the Agricultural Bureau, Mr. W. J. Spafford, Deputy Director of Agriculture, said to compare foodstuffs of similar kind, such as grains, when used for fattening or maintenance purposes, is fairly easy, because the Starch Equivalents of the materials are strictly comparable

When the production of (*a*) milk, (*b*) eggs, (*c*) growth in young animals, or (*d*) fast or heavy work, are concerned, however, it is a much more difficult proposition, because the amount of digestible crude protein present and its relation to the digestible fat, carbohydrates and fibre must be considered as well as the Starch Equivalent, and a comparison of foodstuffs for any of these purposes is a rather complicated calculation. When arriving at the nutritive value of foodstuffs so that they can be compared it is usual to use the figures showing the digestible nutrients to calculate the *Starch Equivalents* and the *Nutrient Ratio* and to compare the foodstuffs on the figures obtained. A foodstuff with a high Starch Equivalent and a wide Nutrient Ratio, *i.e.*, little digestible crude protein and a lot of digestible carbohydrates, will be good for fattening purposes, whilst one with a low Starch Equivalent and a narrow Nutrient Ratio, *i.e.*, a lot of protein and relatively little of carbohydrates will be a good milk producer, and a general-purpose feed is one containing a fairly high Starch Equivalent and a fairly narrow Nutrient Ratio.

Plump Wheat (63½lbs. per bushel) has a Starch Equivalent of 76 per cent. and a Nutrient Ratio of 1 to 10.4; Shrivelled Wheat (51¼lbs. per bushel) has a Starch Equivalent of 72¼ per cent. and a Nutrient Ratio of 1 to 8.3, and Algerian Oats have a Starch Equivalent of 59 per cent. and a Nutrient Ratio of 1 to 7.8.

As Cocky chaff is a relatively poor foodstuff for farm animals, added concentrates will need to supply most of the nutrient the livestock are to receive, and on the figures quoted it will be seen that crushed plump wheat will be the best addition for fattening animals, shrivelled wheat easily the best general-purpose concentrate, and oats a slightly better milk producer.

Gold Medal Competition for Butterfat Production.

Seven years ago the United Dairy Cattle Breeders' Association of South Australia inaugurated among its members a butterfat production competition, the figures for which were to be based on the results of official testing, and the computations to be made by officers of the Department of Agriculture.

A special set of rules was drawn up by the Association. Special handicaps were agreed to for the various age cows, and certain concessions permitted in respect of cows which, owing to illness or other eventualities, would be unable to produce to the maximum of their capacity. These rules have undergone slight changes during the seven-year period, and handicaps have on occasions been altered to adjust, according to the Association's opinion, the normal disparity of production between the younger and the older cows.

The rules for the year 1933-34 were as follows:—

1. At least six cows per herd to be entered for competition.

2. In herds of more than six cows owners were permitted to withhold from competition 25 per cent. of their number, but not more than 25 per cent., and with the proviso mentioned in Rule 1.

3. Handicaps were:—

	lbs. Butterfat.
For junior 2-year-old cows	120
For senior 2-year-old cows	100
For junior 3-year-old cows	80
For senior 3-year-old cows	60
For junior 4-year-old cows	40
For senior 4-year-old cows	20
For mature cows	Nil

The winner of the competition in the year just closed is one whose name has headed the list as many as four previous occasions, and is the well-known Friesian breeder, Mr. C. J. Morris, of Monteith. Mr. Morris to be congratulated on again winning the much-coveted place of pride and distinction, and for adding still another gold medal to his valuable collection of trophies.

Appended are the winners for the seven years:—

	lbs. Butterfat.
1927-28—Mr. C. J. Morris, Monteith	556.58
1928-29—Mr. J. A. J. Pfitzner, Hampden	456.81
1929-30—Mr. C. J. Morris, Monteith	496.69
1930-31—Mr. C. J. Morris, Monteith	465.21
1931-32—Mr. C. J. Morris, Monteith	560.94
1932-33—Mr. C. E. Verco, Mount Compass	563.47
1933-34—Mr. C. J. Morris, Monteith	552.48

Mottle-Leaf of Citrus.

The Secretary of the Beetaloo Valley Branch of the Agricultural Bureau has been advised by the Deputy Chief Horticultural Instructor (Mr. A. G. Strickland, M.Agr.Sc.) that mottle-leaf occurs in all countries where citrus is grown, but owing to the many different factors which have been shown to contribute to the condition, the questions of cause and control cannot be answered in a general statement.

In every instance the trouble is due to faulty nutrition, but the respect in which nutrition is faulty need not necessarily be the same in all cases, and, furthermore, the factors which bring about unbalanced feeding of the tree may also vary. Among the many possible explanations of mottle-leaf in citrus are:—Insufficient nitrogen, excessive nitrogen, lack of humus, deficiencies of certain elements (such as zinc), or the presence of toxic minerals (such as Lithium or Boron) in soil or irrigation water. In respect to the last-mentioned explanation, one serious outbreak of mottle-leaf in California was traced to soil contamination with drainage from a fruit-washing plant using the borax treatment.

In other cases occurring in the United States of America, mottle-leaf has been successfully corrected with heavy dressings of iron sulphate. More recently it has been shown that the beneficial results derived from iron sulphate were due to zinc impurity in the iron sulphate employed. At present experiments are being conducted with dressings, injections and sprays of zinc sulphate. The treatments have shown promise, but are only in the experimental stage, and in many instances have resulted in serious tree injury.

Samuel and Piper have found gray-speck disease of oats occurring in South Australia to be a manganese deficiency disease, and have suggested that mottle-leaf may be in a similar category. Confirmation or otherwise of this suggestion rests in an attempt to grow citrus in the complete absence of manganese, and this is being done by Haas, of the California Agricultural Experiment Station.

Despite the proof that mottle-leaf may be caused by toxic proportions of certain minerals, and by deficiencies of others, there have undoubtedly been cases of the disorder in Australia which have been rectified by normally good soil management. In some Victorian citrus districts mottle-leaf is associated with saline soils, high water table, and lack of soil humus. More careful irrigation methods, whereby the accumulation of salt is avoided and the water table kept reasonably low, have often helped to overcome the trouble in such cases.

In this regard it is also worth noting that the regular growth of green crops greatly assists in controlling a water table, and the turning under of such crops enriches the soil in humus, the lack of which may be a contributing cause to the mottle-leaf.

It is readily apparent that the varying conditions which are found to encourage mottle-leaf do so by virtue of their disturbing effect on the feeding process of the tree. Further to this, good cultural practices, adequate—but not excessive—applications of fertilizers, careful irrigation, green cropping, &c., all assist proper tree nutrition. As to the case of mottle-leaf which has inspired this inquiry, a critical examination of the practices on the grove in question may yield a clue to the most promising line of attack on the problem.

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. Spafford, Deputy Director of Agriculture.]

Pinnaroo Conference: What variety of oats of earlier maturity than Algerian is recommended for the Parilla Well District?

After some years of experimenting with a large assortment of varieties of oats, there are few, if any, which have proved superior to Algerian for general purposes, but for special conditions there are some kinds which can be recommended. Early-maturing

sorts are valuable for grazing purposes, but rarely give as heavy a hay-cut as later kinds, and they cannot be expected to give such yields of grain as the varieties which take a little longer to mature. Of the early varieties which have been in the State for some time *Early Burt* is the best for grazing purposes, and makes fair hay, which is, however, a little on the light side. *Palestine* makes fair quality clean-strawed hay, and gives fairly good grain yields, but is liable to suffer a lot of damage if rust is about. *Early Kherson* has persisted but is rather too erratic as a yielder.

If it is essential to have an early variety for the district *Early Burt* is probably the best of the type, but it is doubtful if we have a better variety for the conditions than *Algerian* for general purposes.

[Replies to questions at the Murray Lands East Conference.]

Barley in a Crop Rotation.

In a system of crop rotation is Barley objectionable from any other point of view than dirtying the land?

Barley as a rotation crop in a wheat-growing district is not objectionable from any point of view, provided it is grown in the right position in the rotation, and there is not nearly enough of this cereal grown in the lower rainfall districts of South Australia. Barley growing is bad preparation for all other cereals, and as a consequence should always be followed by at least one year of pasture or by bare fallow before another cereal crop is attempted.

For the district a rotation of cropping, consisting of—

(*a*) bare fallow,
(*b*) wheat,
(*c*) barley,
(*d*) pasture,
(*e*) pasture,

should be workable, although in all probability growing the barley on bare fallow in a rotation of—

(*a*) bare fallow,
(*b*) wheat,
(*c*) pasture,
(*d*) bare fallow,
(*e*) barley,
(*f*) pasture,

would be better.

At Veitch Experimental Farm over the 16-year period ending with 1930, all wheat crops averaged 9 bushels 14lbs. per acre, whilst all barley crops, of which most were grown on stubble land, averaged 13 bushels 4lbs. per acre. At the same farm, for 9 consecutive years, wheat on bare fallow averaged 13 bushels 32lbs. per acre, whilst barley on bare fallow with similar cultivation and manurial treatments as given to the wheat crops, averaged 18 bushels 46lbs. per acre.

Early types of 6-rowed barley grown on fallow would give good yields in the district, and now that the State has embarked upon an export trade in pigs, the grain should sell well as pork.

Barley growing does not encourage weeds on the farm, because it is the best weed-smotherer of any crop which can be successfully grown in most of the wheat-growing districts of South Australia, and it does not foul the land with barley on any farm where correct bare-fallowing practices are followed. There are plenty of farms in the State which have continuously grown considerable areas of barley for upwards of 30 years, and in most cases there is less barley to be seen in the wheat and oat crops on such farms than on plenty of farms which have never grown an acre of barley.

If the land is always fallowed after barley before another kind of crop is grown, either immediately after the crop or after a pasture, it is impossible to foul the land with barley as a weed except from the droppings of horses which have eaten whole barley in the hay or as grain, and then only from droppings at seeding time.

Livestock Carrying Capacity of Murray Mallee Farms.

What would be the result in regard to carrying capacity of farms in the Murray Mallee if a total change-over to grazing were instituted? Would the grazing value diminish from year to year as a result of no cultivation, and, if so, would top-dressing help to maintain the grazing capacity?

There are so many variations in natural conditions obtaining in different parts of the Murray Mallee that it is quite impossible to give a detailed answer to the question in a short statement. The average annual rainfall varies from over 17½in. at Coonalpyn to just over 9½in. at Waikerie, and soils comprise all classes between clay loams and white sand, and all these variations affect the position.

Without exception the grazing value would commence to diminish a few years after cultivation was stopped and would continue to get less for a varying length of time, in some cases reaching stability quickly, in others taking a number of years.

In the better parts of the Murray Mallee, the deterioration would be rapid, but not so very great, because plenty of useful grazing plants would persist, and in these localities the regular top-dressing of the land with superphosphate would greatly increase the quantity and quality of the pasture and render the holdings really good grazing country. At present prices, and where the average annual rainfall is 15in. and upwards, the equivalent of 60lbs. to 80lbs. superphosphate per acre per year should prove an economic dressing, but the grazing value of farms would be considerably increased if some of the fields were seeded down to lucerne, and if Wimmera Rye grass and King Island Melilot were scattered over the fields. The top-dressing should be done with a drill, with the hoes scratching the surface of the soil, rather than with a revolving broadcasting machine.

Where the average annual rainfall is about 13in. to 14in., the deterioration of the pastures will be greater than in the higher rainfall parts of the district, and it will be necessary to seed the land to fodder plants as well as top-dress with superphosphate if the grazing returns are to be kept up. For this purpose Wimmera Rye grass and lucerne should be used, the Wimmera Rye grass being spread all over the holdings and lucerne being properly established in some of the fields. In these conditions from 50lbs. to 60lbs. of superphosphate per acre per year should prove a business proposition in existing conditions.

Returns would be increased if portions of the holding were seeded each autumn with cereals, put in with drill or combine at top-dressing time.

The position is much more difficult where the average annual rainfall is about 10in. to 11in., and particularly so on the rubbly-limestone soils, because the deterioration of the pastures is so great on the rubbly-soils, finishing with some spear grass and barley grass, and a lot of the useless squash weed and false samphire, and on the sandy soils consisting almost wholly of barley grass. The top-dressing of such country improves the pastures, but can hardly be made an economic proposition. If cleared land in farm-size areas is to be used wholly for grazing purposes, cereals, and preferably mixtures of two or three kinds, should be drilled in with some superphosphate every autumn on a fairly considerable proportion of the holding. The addition of a little Wimmera Rye grass seed to the drilled area each season would increase the grazing value of the farm, and a few fields seeded to lucerne would be of additional value.

Moisture Holding Ability of Heavy and Stony Land.

Which land retains moisture the longer, heavy land or stony land with sand drifted over it? Is stony land of this description more susceptible to "take-all" and other diseases?

The retention of moisture in soils that are being cropped does not depend so much upon the soil type as it does upon the mechanical condition the soil is in. Any soil with a layer of loose friable soil at the surface will retain moisture longer than one that has been allowed to become set together. If the heavy land, and the stony land covered with sand were both uncultivated, the chances are that the heavy land would lose its moisture first, because of the naturally loose sand acting as a mulch, but there would not be much difference if they were both properly cultivated.

The position is different so far as giving up their moisture to plants is concerned, for on an equal rainfall, the plants will suffer for the want of moisture much sooner on the heavy land than where much sand is present. Plants can continue to collect moisture from coarse, sandy soils without wilting until there is less than 1 per cent. of moisture left in the soil, but heavier-textured soils retain much more moisture, and even in an ordinary clay loam plants will begin to wilt when there is still 14½ per cent. of moisture in the soil, and even sooner than this in a clay soil.

"Take-all" and other foot-rot diseases of wheat are always more likely to occur in soils that do not compact together readily, and as it is extremely difficult to get sand which has drifted over stony land really firm, these diseases will be more prevalent than on any of the heavy land of the district which has been properly cultivated.

Premium for Wheats of High Gluten Content.

In connection with the investigations regarding the gluten content of wheat, recommendations have been made for the discouragement of certain wheats of low gluten content but of high average yield...Has any premium for growing wheats of high gluten content been contemplated?

On several occasions during the past 25 years or so, various local millers have paid a premium for wheats with outstanding bread-making qualities, but so soon as the special circumstances warranting the extra expenditure were removed, they reverted to the practice of purchasing all varieties at f.a.q. By judiciously selecting and blending wheats from certain districts in the State, millers have been able to make flour which suited local requirements admirably, and as Australian wheats, in normal times, have not been sold on the overseas markets in competition with strong-flour wheats, there has been no particular reason why higher prices should have been paid for exceptionally strong-flour wheats. The position is rather different at the present time, for while the farmer could only get f.a.q. prices for whatever quality wheat he produced, he naturally looked for heavy-yielding varieties, with the consequence that quality has been neglected and the standard of the wheats has been lowered. This lowering of the standard of quality has come so gradually that it was almost unnoticed until there was a world's surplus of wheat, with the consequent difficulty of selling anything but the very best at a price comparable with that received by other countries. This change from the old order of selling our wheat readily because of its cleanness, whiteness and brightness of flour and nutty flavour, has led to the awakening of all people interested in the sale of Australian wheat, and there has been a general focussing of attention on the need for improved quality if we are to regain and hold the markets when normal times recur.

Included in this determination to raise quality and because of the difficulty of purchasing sufficient good quality wheat for local requirements, some millers in this State are paying a premium for wheats of good flour strength at the present time, and believe that the practice has come to stay.

Ensilage Versus Hay.

Are any definite figures, or is information available in regard to the relative value of ensilage and oats and/or barley harvested or cut for hay; i.e., *given a crop of either cereal sown for fodder conservation purposes, which system gives the greater feeding value, taking into account the cost of conservation by each system?*

Sufficient work has been done with oats and barley in connection with the harvesting and storing of both crops as hay, silage and matured grain to compare them as *fattening foodstuffs*, but unfortunately there is no known method of calculating a single figure which will adequately express the value of a foodstuff for the production of—

(*a*) milk,

(*b*) eggs,

(*c*) growth in young animals, and

(*d*) fast or heavy work,

and, further, it is quite impossible to put a money value on the succulence retained by silage, and the increased palatability given to foodstuffs when converted into silage.

Assuming that these cereals, oats and barley, are to be conserved in the Caliph district for *fattening or maintenance purposes only*, they can be compared on the number of pounds of starch equivalent per acre still in the fodder stored.

OATS.

1. On the assumption that oats grown on fallow will average 1 ton of hay per acre, as the crop did at Veitch Experimental Farm over a 21-year period, this, with a starch equivalent of 35.2 per cent. equals 788lbs. of starch equivalent per acre.

2. A ton of oaten hay containing 11 per cent of moisture, would weigh 8,668lbs. if cut as green stuff containing 77 per cent. of moisture, as it will when being put into a silo. Allowing 15 per cent. loss in manufacture, 7,368lbs. of silage per acre should be removed from the silo, which, with a starch equivalent of 8.9 per cent. will contain 656lbs. of starch equivalent.

3. Assuming the oat crop to average 15 bushels of grain per acre at Caliph, as it did at Veitch Experimental Farm, the 600lbs. with a starch equivalent of 54.8 per cent. will provide 329lbs. of starch equivalent.

If a 1-ton crop of oaten hay is allowed to mature it will lose weight and when cut will weigh 1,837lbs. If the stock eat two-thirds of the 1,237lbs. of straw left in the field, allowance must be given for 140lbs. of starch equivalent, because the straw contains 17 per cent. of starch equivalent. The grain stored and the straw eaten are worth 469lbs. of starch equivalent.

4. The hay will cost about 16s. 6d. per acre to put into the stack, using Turretfield figures. The silage will cost about 31s. per acre to store in a pit. The grain should cost about 11s. 3d. per acre to bag and put in a shed.

It will be noted that no provision has been made for rendering hay stacks mouse-proof, for overhead charges in connection with pit silo, nor for storing grain in a weevil-proof receptacle, all of which should be considered in connection with conservation of the various forms of fodder.

BARLEY.

Again using yield figures from Veitch Experimental Farm the value of the barley crop stored in different ways is, for *fattening purposes*—

1. 18cwts. of hay per acre with 36 per cent. starch equivalent, contains 726lbs. of starch equivalent.

2. The silage from such a crop, with 9.2 per cent. starch equivalent, contains 610lbs. of starch equivalent.

3. The 17 bushels of grain, with a starch equivalent of 72.7 per cent., carries 620lbs., and two-thirds of the 803lbs. of straw (19 per cent.) contains 102lbs. of starch equivalent, making a total of 722lbs. of starch equivalent in the grain stored and the straw eaten in the field.

4. Costs to store are about 14s. 10d. per acre for hay, about 28s. 2d. per acre for silage and about 12s. 9d. per acre for grain.

Pastures for Hundred of Clinton.

"Clinton" asks: "What would be the most suitable grasses to grow on a mixed farm in the hundred of Clinton?"

Reply—The natural conditions obtaining in the neighbourhood of the township of Price are rather severe for the growing of many kinds of pasture plants, still there are a couple that can be grown fairly well in association with the ordinary cereal-growing practices.

Wimmera Rye Grass.—Unless some fields are to be kept in pasturage, and rested from cropping for several years the best addition you can make to your grazing plants is likely to be Wimmera Rye grass. This grass is a weed that competes well with barley grass, but is much more valuable as a fodder, and once established on a wheat farm persists with the same certainty as most other weeds. It is easily established by drilling about 2lbs. seed per acre in with cereal crops that are to be harvested for grain, and is done by mixing some seed with the superphosphate every time manure is put in the drill.

Lucerne.—If fields are to be rested from cropping for 3 to 5 years Lucerne is the best pasture plant for your conditions. It should be established in a stubble or on fallow, but not with a cereal crop. The seed at the rate of 4lbs. or 5lbs. per acre should be mixed with superphosphate and be drilled in to a shallow depth only. If seeded in a stubble a disc-drill is necessary to do the job but any seed-drill or combine is suitable for seeding on fallowed land. It is essential if portion of a field is seeded that it be fenced off, as no one has succeeded in establishing 20 acres of lucerne in a 200 acre field.

Other than Wimmera Rye grass and Lucerne the only grazing plants worth consideration are likely to be cereals drilled in early, although if the fields which now grow Burr Clover be top dressed, in the autumn of the year when they are to be left out as pasture, the chances are they would grow as much pasturage as if cereals were seeded into the land. Superphosphate at the rate of ½cwt. per acre per year would activate the burr clover very considerably.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

Pinnaroo Line Bureau Conferences: How much sulphur is it advisable to feed to a working horse?

Reply—Horses are unlike other farm stock—cattle, sheep and pigs—in that they are only required for work, and not to produce such products as milk, meat or wool. For this reason, and because they are not quickly maturing animals, their mineral requirements are comparatively low, and are present in an average ration. Horses do not suffer from a deficiency of sulphur in their ration, and it is, therefore, not advisable to feed this mineral to them.

SPLIT IN TRUNK OF NECTARINE TREE.

Asking how to treat a bad split in the main arms of a five-year-old nectarine, the Secretary of the Snowtown Branch of the Agricultural Bureau has been advised by the Deputy Chief Horticultural Instructor (Mr. A. G. Strickland) that putting a bolt through the split portion is the best means of dealing with the trouble. Before drawing the split portion together by means of a bolt, the exposed wood and inner bark should be trimmed to a fresh living surface, so that when the two surfaces are made to meet, there will be an opportunity for them to heal together. After drawing the two portions of the trunk together, anoint the exterior of the treated part with grafting wax or a bituminous compound such as "Colas." If the latter is used, care should be taken to prevent the material running down between the two joined trunk portions, as in such case, the knitting of the two sections may be prevented.

ACTIVITIES AT ROSEWORTHY AGRICULTURAL COLLEGE, 1933-34.

[By A. R. CALLAGHAN, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.), Principal.]

PART V.—LIVESTOCK IMPROVEMENT.

During the year some very valuable additions were made to College stud stock, and it is fitting and proper that these additions should be recorded, for it is at least expected that their influence on the future quality of College livestock will be marked by substantial improvement. A genuine effort was made during the year to lay the foundations for future improvement, and the question of purchasing suitable and reliable sires was the first consideration. In this regard, I am pleased to be able to report that satisfactory purchases were made, all of which should lead to a definite advance in quality. The Clydesdale colt "Cyrus" was imported from New Zealand, two young Jersey bulls of known and well reputed blood lines were acquired locally, and a very fine Southdown ram was imported from New Zealand. Other purchases were made, all of which are herein recorded.

THE CLYDESDALE STUD.

Two important acquisitions to the Clydesdale horses at the College were made during the year in the colt "Cyrus" and the mare "Kowai Gyp." The old stallion, Bangaroo Laddie, was sold by auction at the July sales of 1933.

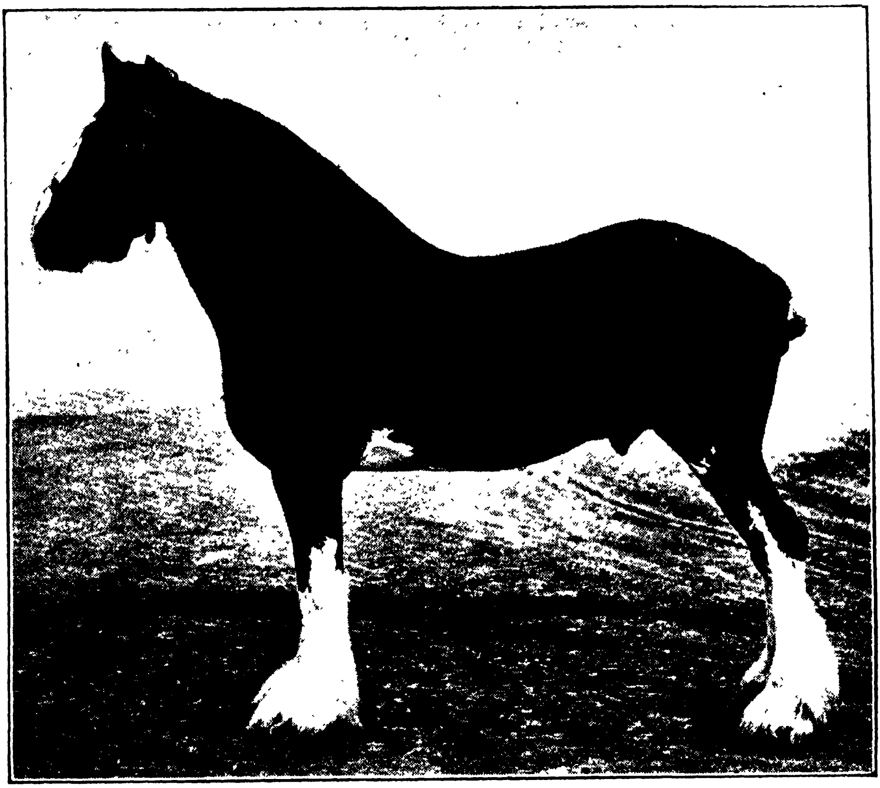
Cyrus (imp. from New Zealand 2455 N.Z.C.S.B.) was born on January 1st, 1931, and was bred by Mr. Alex. Hunter, of the Moore Hunter Estate, Hawera, New Zealand. He was inspected and bought on behalf of the College by Mr. Tom McKay, of Kadina, at the instigation of the Minister of Agriculture, Hon. S. Whitford, M.L.C. Cyrus is by Bonnie Dene out of Frills; his dam was also by Bonnie Dene as shown in his full pedigree cited on next page.

PEDIGREE OF CYRUS (2455 N.Z.C.S.B.)

Bonnie Dene (Imp. in utero) 840 N.Z.C.S. B.	Bonnie Buchlyvie 14302	Baron of Buchlyvie 11263	Baron's Pride 9122	Sir Everard 5358
				Forest Queen 7233
			Young Maybloom 12003	Knight Errant 4483
				Maybloom 4157
		Queen of Beauty 14850	MacGregor 1487	Darnley 222
				Sally 60
			Lady Louisa 12036	Prince of Wales 673
				Violet of Portencaillie 9503
	Maid O'Threave (Imp.) 34601 (N.Z.C.S.B. 1069)	Benedict 10315	Baron's Pride 9122	Sir Everard 5353
				Forest Queen 7233
			Mary MacGregor 12864	MacGregor 1487
				Do or Die 8908
		Jenny Weir 34600	Woodend Gartley 10663	Royal Gartley 9844
				Bonney Jean of Woodend 13165
			Mall II. 13691	MacTopper 8831
				Mall of Meikle Dalbeattie 9371
Frills 3430 N.Z.C.S.B.	Bonnie Dene (Imp. in Utero) 840 N.Z.C.S.B.	Bonnie Buchlyvie 14302	Baron of Bucklyvie 11263	Baron's Pride 9122
				Young Maybloom 12003
			Queen of Beauty 14850	MacGregor 1487
				Lady Louisa 12036
		Maid O'Threave (Imp.) 34601	Benedict 10315	Baron's Pride 9122
				Mary MacGregor 12864
			Jenny Weir 34600	Woodend Gartley 10663
				Mall II. 13691
	Lingerie 1378 N.Z.C.S.B.	Buchlyvie Favourite 16955	Royal Favourite 10630	Royal Gartley 9844
				Rosie of Arnprior 12754
			Nancy of Knockinlaw 21322	Baron's Pride 9122
				Nancy Lee 13855
		Hinemoa (Imp. in Utero) 1371	Mundale 15966	Marcellus 11110
				Dorothy of Delny 18091
			Bathgate 28223	Baron Ruby 11268
				Jean of Carinstone 16288

From the pedigree it will be observed that Cyrus comes from a line of Clydesdales which is famous in Scotland to-day, for his sire, Bonnie Dene, is by Bonnie Bucklyvie, and his dam, Frills, is also by Bonnie Dene out of a Bucklyvie mare. It is claimed for Bonnie Bucklyvie that the first eight prize-winning sires in England and Scotland at the moment are sons, or out of mares, of which he is the sire.

Since his arrival Cyrus has made wonderful progress, as indicated by the photograph published here, which was taken in August of this year.

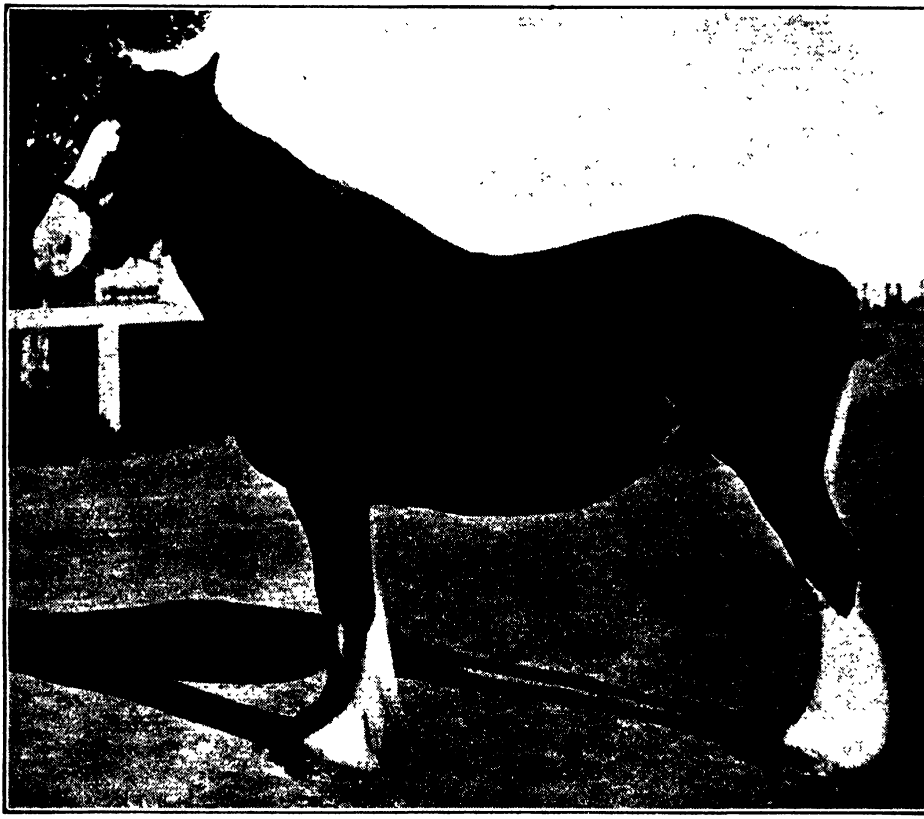


CYRUS (imp.), by Bonnie Dene from Frills. The photograph was taken when he was 3 years and 7 months old.

No attempt to describe the horse will satisfy the multitude of horse judges pervading the country, but an independent opinion which appeared in the *New Zealand Farmer* at the time of his purchase should be of interest to all; for this reason the following extract is given:—"Like the Royal champion colts of both the New Zealand and Sydney Royal Shows of the present season Cyrus is bred on the popular Bonnie Dene-Buchlyvie's Favourite cross, but in addition he is one of the most intensely bred colts of his class yet produced in the Dominion. Cyrus is not only sired by the great breeding horse Bonnie Dene, but he is also out of a daughter of the same sire in the champion mare Frills, winner of the Union Steamship Company's cup. Frills is from another noted prize winning mare in Lingerie by Buchlyvie's Favourite (imp.), while her granddam is that illustrious imported prize-winning mare Hinemoa, which founded one of the most notable lines of Clydesdales of the best type. Cyrus is a rare type of Clydesdale colt, with bone, feet, and ankles of the highest class, a grand outlook, ample weight and substance for his age, and is a close moving, active horse, and has every credential for an outstanding success at the stud. It is seldom that such

intensive breeding is attempted, but in this case Mr. Alex. Hunter has scored an outstanding success."

Another outside opinion was given at the time Cyrus was purchased by a writer in the *Pastoral Review.* Referring to the old-time trade between New Zealand and Australia in Clydesdale horses being renewed, this correspondent states:—"Perhaps the most important sale made recently was that of Cyrus, by that great breeding horse Bonnie Dene (imp.). In addition to being one of the most attractive colts yet bred in the Dominion, Cyrus, who claims all the best merits of the breed, is the result of a unique experiment in the science of breeding, as, in addition to having being sired by Bonnie Dene, his dam, Frills, a noted winner, is also a daughter of that sire. Cyrus is supported also by



KOWAI GYP (imp.), by Ellangowan from Kowai Petal. Rising five year old.

other great strains of blood, as his granddam Lingerie, one of the greatest prize-winning mares in New Zealand, was by Buchlyvie's Favourite (imp.) from the famous old Parorangi foundation mare, Hinemoa (imp.)."

From the College point of view I can say with full confidence that his temperament is unimpeachable, that he is remarkably docile, tractable, and intelligent for his age, yet extremely energetic.

Cyrus is available for service to a limited number of outside mares at a reasonable fee.

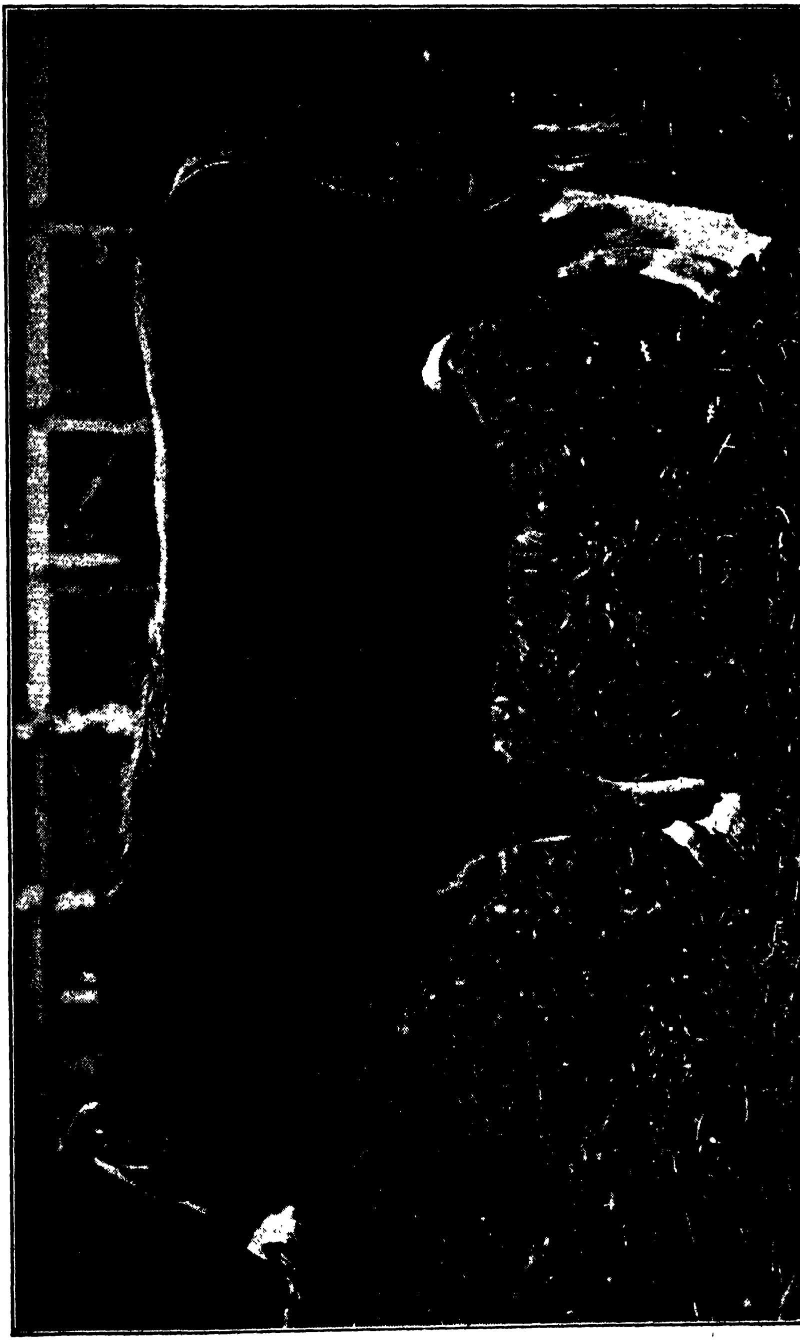
Clydesdale Mare, Kowai Gyp (imp.) from New Zealand (5150 N.Z.C.S.B.)—This mare was imported by Mr. Tom McKay, of Kadina, from whom she was acquired by the College. She is a bay mare, was born in November, 1928, and was bred by Mr. James Wyllie, of Sefton, North Canterbury, New Zealand. At present she is in foal to Cyrus.

PEDIGREE OF KOWAI GYP (IMP. 5150 N.Z.C.S.B.)

Ellangowan (Imp.) 20745 C.S.B.	Dunure Exemption 20006 C.S.B.	Dunure Independence C.S.B. 18706
		Royal Bell C.S.B. 23633
	Dunure Lady Brand 52145 C.S.B.	Dunure Footprint 15203 C.S.B.
		Belmouth Carter C.S.B. 21232.
Kowai Petal 3830 N.Z.C.S.B.	High Honour 902 N.Z.C.S.B.	King of Honour (Imp.) 15906 C.S B.
		White Silk (Imp.) 27394 C.S.B.
	Nell of Luckdrivic (Imp.) 381830 C.S.B.	Sir Hugo 10924 C.S.B.
		Mac's Comely 16307 C.S.B.

Her pedigree is sufficient to indicate the excellence of her ancestry.

PARA WIRRA PRIDE II., by Para Wirra Collegian from Para Wirra Sweet Iris. The photograph was taken when he was just over 2 years old.



DELMA LILY'S GAMBOGE, by Woodside Agatha's Gamboge from Woodside Lily's Bouquet. Photograph shows the bull at 18 months old.

THE JERSEY STUD.

Through the purchase of the two young Jersey bulls, Delma Lily's Gamboge and Para Wirra Pride II., from Mr. E. W. Pfitzner, Eudunda, and Mr. Howard Dawkins, Gawler River, respectively, valuable additions were made to the College Jersey herd. In addition the cow Hampden Rachel, in calf to Bellefaire Blonde's Aristocrat, was purchased from Mr. J. A. J. Pfitzner, of Eudunda. Through the introduction of this new blood the production of the herd, which is already good, should be improved, but the greatest improvement should be in type, which was a leading consideration when the purchases were being made.

Delma Lily's Gamboge was born on January 17th, 1933, and the photograph reproduced here was taken in August, 1934, when the bull was a little over 18 months old. The bull is of broken colour and of all imported blood, by Woodside Agatha's Gamboge from Woodside Lily's Bouquet (imp. in dam). His dam won the first prize in the three-year-old class at the Adelaide Show, 1933. His sire, Woodside Agatha's Gamboge, was by Old Farm Gamboge (imp.), a first prize winner at the Sydney Show in 1931 and 1933, and a bull that is very well known in Jersey circles throughout New South Wales, while the dam of his sire, Agatha's Sultan Jest (imp.), was a first prize winner at the Sydney Show in 1931.

In the pedigree of the bull, given in full below, appear the names of some of the leading Jerseys which have made the breed famous throughout the world, such as Sybil's Gamboge 9th, Sybil's Successor, Design's Fern Oxford, You'll Do's Volunteer, Blonde's Golden Oxford, Day Dream 10th, and Oxford Sultan of Oaklands twice. It is interesting to note that Oxford Sultan of Oaklands is the grandsire of Brampton Basilua, the cow that last year created the world Jersey record by producing under official test 1,312lbs. of butterfat in 365 days.

Para Wirra Pride II.—This bull is of splendid type with outstandingly good head character. He was bred by Mr. Howard Dawkins, and comes from especially good type stock as well as good producers, and because of his breeding is expected to nick well with the College cows, most of which are descended from a similar blood line to that indicated by the ancestry of Para Wirra Pride II. He was sired by Para Wirra Collegian, and his dam was Para Wirra Sweet Iris. On his sire's side he goes back to the well-known Maglona blood, while the dam of his sire was Cherry of Willow Farm, a cow that was universally admired. The latter tested 485lbs. of butterfat in 273 days. The dam of the bull was by Mercedes Sweet Duke out of Iris of Grantala; this cow, the granddam of the bull acquired, tested 460lbs. and 470lbs. in two consecutive tests over 273 days duration. Acquired from a breeder of such recognised merit as Mr. Howard Dawkins and upon whose opinion as to the suitability of the blood-line was sought, it is felt that this bull will help considerably to obtain refinement of type without in any way prejudicing the good production record of the herd. He was born on July 30th, 1932.

Hampden Rachel.—This cow was born on March 27th, 1929, and was bred by Mr. J. A. J. Pfitzner, of Eudunda, from whom she was acquired. She was sired by Hampden Olives King out of Hampden Rae. One of the conditions of the purchase was that she be in calf to Mr. Pfitzner's well-known bull, Bellefaire Blonde's Aristocrat, which has been breeding particularly well.

THE PIG STUDS.

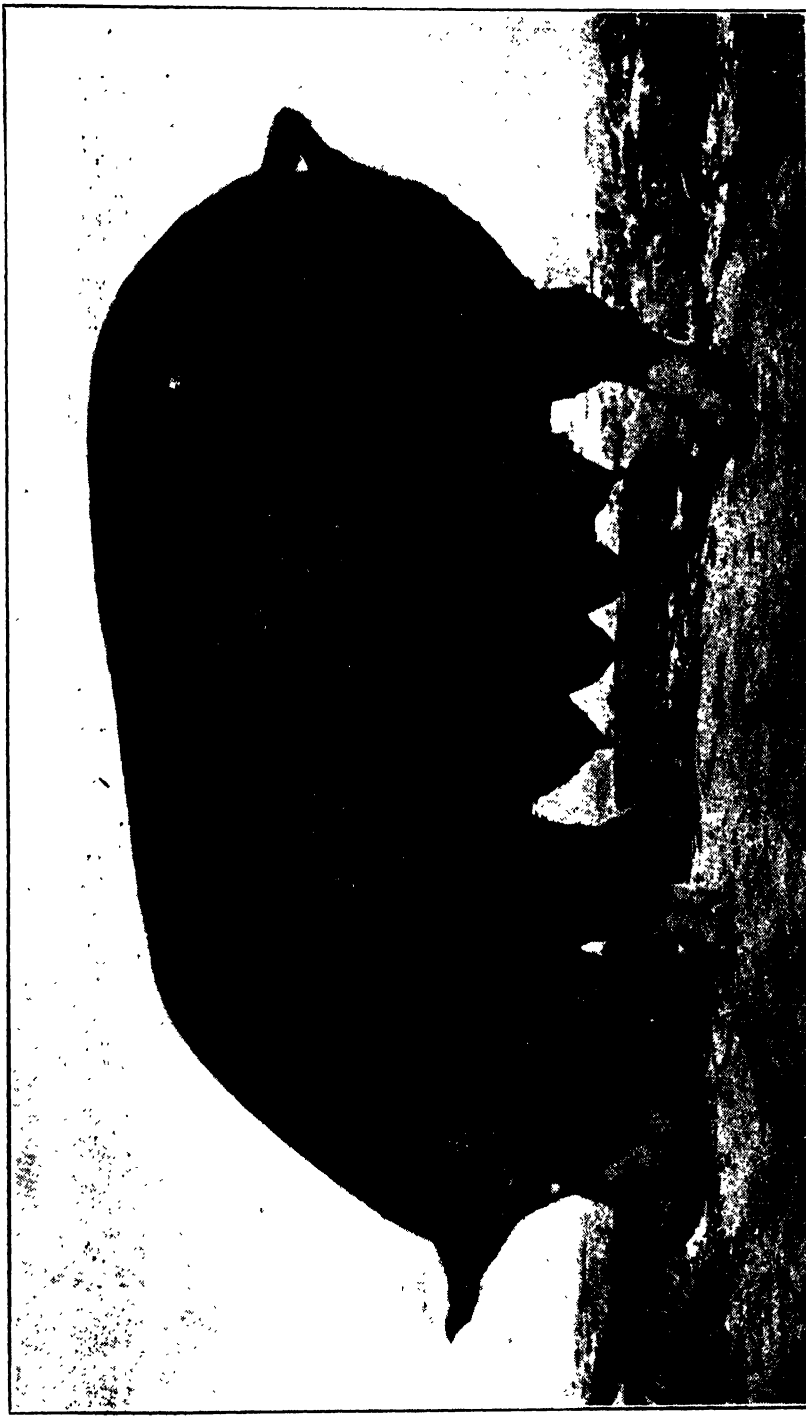
The outstanding importations to the College pig studs during the year under review were two Canadian Berkshire pigs (a boar and a sow), a Tamworth boar, and two Tamworth sows.

PEDIGREE OF DELMA LILY'S GAMBOGE.

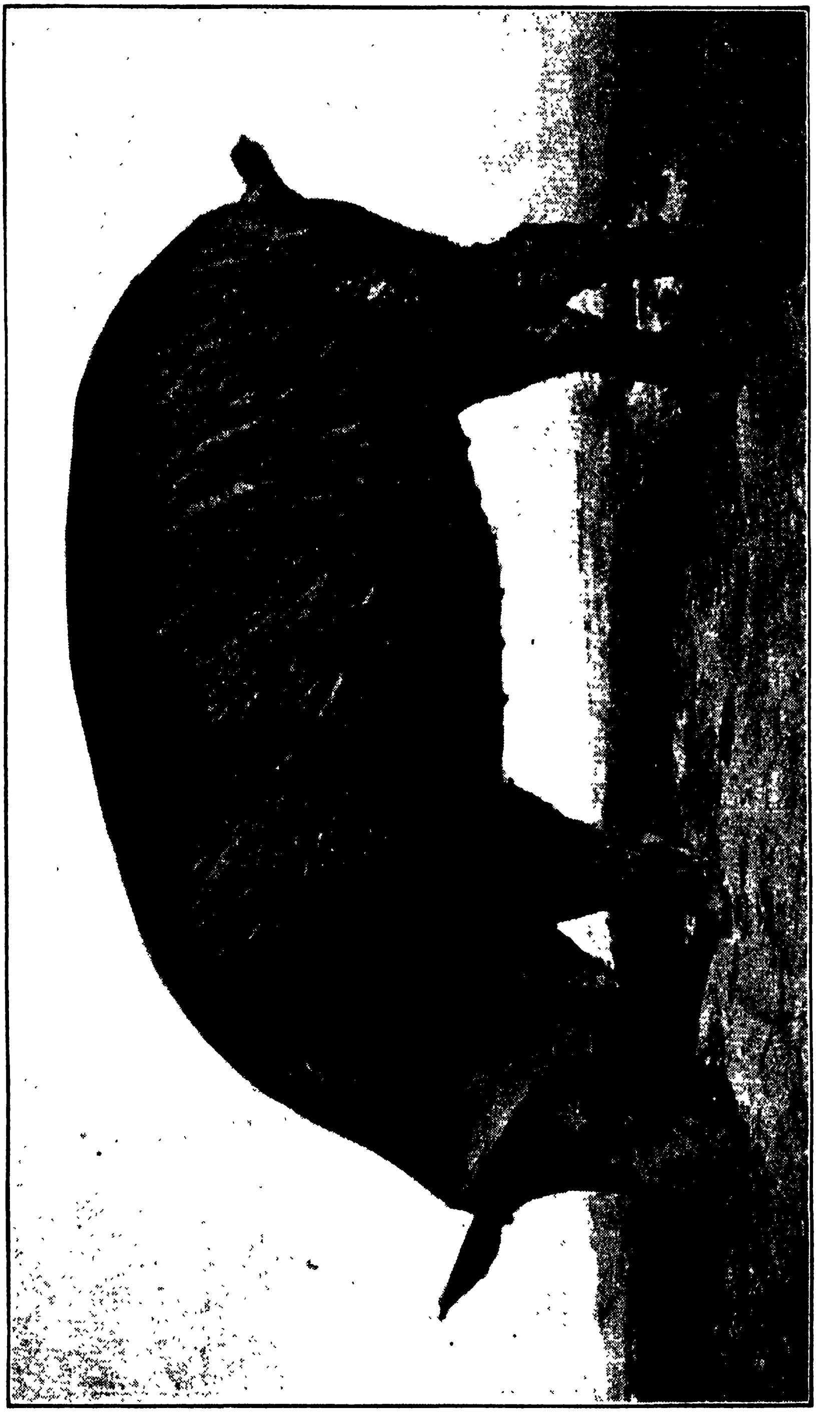
Woodside Agatha's Gamboge 8166	Old Farm Gamboge (Imp.) 6948	Sybil's Gamboge 9th 6388 P.S.H.C.	Sybil's Successor 5849 P.S.C.	Sybil's Gamboge 3rd 5554 P.S.H.C.
				Ronald's Fontaine Duchess 22179 P.S.H.C.
			Valley Sybil 30497 P.S.H.C.	Sybil's Gamboge 4th 5707 P.S.H.C.
				White Stella 25038 P.S.H.C.
		Snowdrop of Baulivot 36371 P.S.H.C.	Plymouth You'll Do 6191 P.S.H.C.	You'll Do's Volunteer 5920 P.S.C.
				Hittit 16862 P.S.C.
			Snowdrop of Les Prairies 29359 P.S.C.	Oxford Sultan of Oaklands 5182 P.S.H.C.
				Hope II. 23103 P.S.C.
	Agatha's Sultan Jest (Imp.) 29754	Royal Jester 6422 P.S.H.C.	Design's Fern Oxford 5899 P.S.H.C.	Fern's Oxford Noble 3rd 5461 P.S.H.C.
				Design 10th 24362 P.S.H.C.
			Soeurettes Welcome 36985 P.S.H.C.	Fly Sultan 5413 P.S.C.
				Souerette 24711 P.S.H.C.
		Agatha's Sultan Beauty 31734 P.S.C.	Dreaming Sultan 5880 P.S.H.C.	Oxford Sultan of Oaklands 5182 P.S.H.C.
				Day Dream 10th 22429 P.S.H.C.
			Agatha's Oxford Aboukir 23313 P.S.C.	Agatha's Oxford Noble 4850 P.S.H.C.
				Fern's Aboukir 19549 P.S.H.C.
Woodside Lily's Bouquet 38618 (Imp. in Dam)	Anemone's Lily Oxford (Imp.) 6553 P.S.C.	Lily Light Oxford 5978 P.S.H.C.	Cedar's Golden Oxford 3585 P.S.H.C.	Blonde's Golden Oxford 5384 P.S.H.C.
				Cedar Star 21113 P.S.H.C.
			Lily Light 3rd 21589 P.S.C.	Myrtle's Boy 4846 P.S.H.C.
				Lily Light 15129 P.S.C.
		Anemone's May Girl 27740 P.S.H.C.	Anemone's Boy 5520 P.S.H.C.	Pioneer's Noble
				Cedar Star 21113 P.S.H.C.
			Anemone's Pet 24556 P.S.H.C.	Beatall 5121 P.S.H.C.
				Anemone's Beauty 11695 P.S.H.C.
	Blonde Bouquet (imp.) 38316 P.S.C.	Golden Count 6304 P.S.H.C.	Mabel's Golden Double 6051 P.S.H.C.	Golden Maid's Double 5583 P.S.H.C.
				Mabel 62nd 23485 P.S.H.C.
			Pedro's Countess 31589 P.S.H.C.	Pedro 5891 P.S.H.C.
				Sultan's Countess 28600 P.S.H.C.
		Silver Bouquet 34648 P.S.H.C.	Gamboge Duc 5800 P.S.H.C.	Sybil's Gamboge 3rd 5554 P.S.H.C.
				Winter Duchess 22127 P.S.H.C.
			Silver Bloom 18016 P.S.H.C.	Violette's Peer 4439 P.S.H.C.
				Lady Isolda 12754 P.S.H.C.

PEDIGREE OF PARA WIRRA PRIDE II.

Para Wirra Collegian 9900	Para Wirra Maglona's Twylish 2nd 5838	Molly 5th's Audrey Twylish Of Banyule 3086	Audrey's Lord Twylish 985
			Molly 5th of Banyule 5216
		Maglona 3rd of Willow Farm 8359	Collegian 943
			Maglona 2nd 4784
	Cherry 10th of Willow Farm 16803	Lord Silvermine 9th of Banyule 1342	Mabel's Chief (Imp.) 623
			Silvermine 13th of Banyule 4250
		Cherry 7th of Willow Farm 8351	Lord Silvermine 9th of Banyule 1342
			Cherry 3rd of Willow Farm 4780
Para Wirra Sweet Iris 28089	Mercedes' Sweet Duke of Glen Iris 2982	Sweetbread's Duke of Glen Iris 1918	Perree's Duke (Imp. in Dam) 996
			Sweet Bread 24th (Imp.) 2979
		Mercedes' Noble Queen (Imp.) 4241	Noble of Oaklands 3909
			Mercedes Queen 13937
	Iris of Grantala 8354	Burnside 712	Larkspur's Golden Spark 285
			May IX.
		Janet's Queen 22nd of Coolangatta 7315	Bright Lad of Coolangatta 1507
			Janet's Queen 4th of Coolangatta 5526



WAITAWA CANADIAN CLARINDER (tmp.) is a pure-blooded Canadian Berkshire Sow.



HAWKESBURY TRIX, one of the young Tamworth Sows purchased during the year.

Owing to the decided change in recent years in the pig market and the general unsuitability of the pure-bred old type Berkshire, it was deemed necessary to discontinue breeding stud pigs of the old strain. Accordingly the Canadian Berkshire boar, Waitawa Canadian Black Prince, and the sow, Waitawa Canadian Clarinder, both bred by Messrs. S. Austin Carr & Co., of Auckland, New Zealand, were imported and arrived in August, 1933. The boar, which was purchased as a weaner, has not grown into a particularly good representative of the breed, and although he is breeding well, especially crossed with our old type sows, he will be replaced by another pure-bred Canadian Berkshire of better type this year. The sow is a splendid type and an excellent mother. Her photograph is reproduced below. Incidentally she farrowed the first litter of pure-bred Canadian Berkshires to be born in Australia in December last.

The Tamworth boar was bred by and acquired from Mr. H. Bartram, of Heidelberg, Victoria, and the two Tamworth sows were bred by the Hawkesbury Agricultural College, New South Wales. The latter two were purchased as weaners and the photograph of one of these sows, Hawkesbury Trix, is reproduced herein.

No fresh blood was introduced into the Large White Stud during the year.

THE SOUTHDOWN STUD.

During the year the Southdown ewes were carefully graded and the numbers reduced by the sale of several. The demand for flock rams from lamb breeders was high, and all available rams were readily sold. Three ewes were purchased from Mr. S. King (F4), of Fernside, Scott's Creek, Victoria, and a first-class stud ram was imported from New Zealand. Mr. King, of Victoria, kindly purchased the ram "Matatua U96" from Mr. J. Knight (F54, N.Z.F.B.), of New Zealand, on behalf of the College. The ram was sired by "Matatua R167" (5776, N.Z.F.B.) out of a "Matatua" ewe, R163. The photograph was taken at the College in August of this year.

EXPORT COMPETITION LAMBS.

In conclusion, I desire to place on record the achievement of the College in winning the Cooper Cup for the best pen of 15 lambs exported from South Australia through the 1933 Export Competitions arranged by the South Australian Branch of the Australian Society of Breeders of British Sheep. Five entries were submitted, and the results are tabulated below:—

College Entries in Lamb Export Competitions, 1933, Conducted by the S.A. Branch of Society of Breeders of British Sheep.

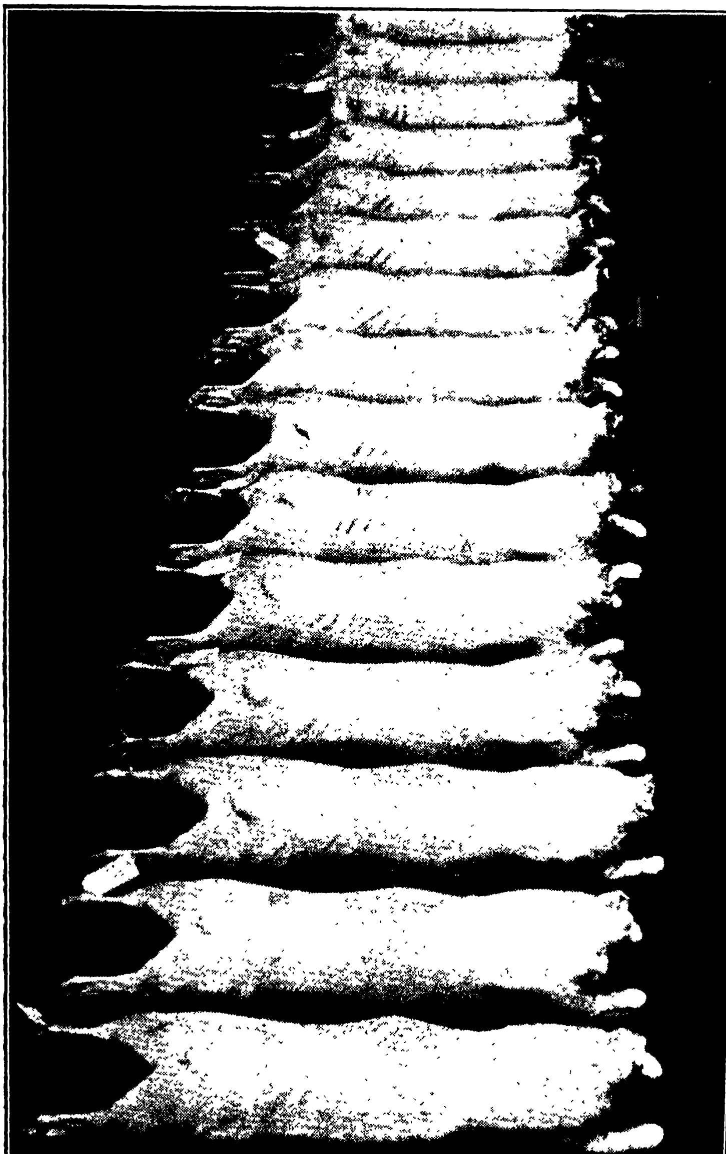
Month	Breed Entered.	No. Exported	Grading.	Points Awarded. Adelaide	Points Awarded. London.	Position.	Total Weight	Net Return Per Head plus 2s. 8d. Skin Value.
								s. d.
July .	Southdown x Dorset Horn Merino	15	All Primo 2	98	99	1st and Cooper Cup	505	19 6
July .	Do.	15	Do.	97	98	3rd ..	519	20 0
Aug.	Do.	15	Do.	93	95	2nd ..	500	19 11
Aug.	Do.	15	Do.	94	94	3rd ..	501	19 11
Sept..	Southdown x Merino	15	Do.	90	96	6th ..	468	17 2

It will be noted that the Dorset-Horn-Merino half-bred ewe figures rather largely in the entries, but last year no other lambs from half-bred ewes were available for the competitions, because the whole of the Border-Leicester-Merino

MATATUA U96 (imp.), the Southdown Stud Ram purchased in New Zealand during the year.

half-bred flock was occupied in experimental work, the lambs from which were shipped independently of the competition. It should not be inferred that the College favours the Dorset-Horn-Merino half-bred in preference to the long wool-Merino half-bred, in point of fact, in most seasons the loss from wool

returns from the Dorset-Horn-Merino half-bred flock in comparison with the Border-Leicester-Merino half-bred is not made up by any extra returns obtained for lambs. It is apparent, however, that the Dorset-Horn-Merino half-bred is a wonderful mother for fat lambs and has the advantage of mating earlier than



Carcasses of the consignment of lambs entered by the College in the 1933 July Export Competition. This entry won the Cooper Cup for the best consignment for the year. The lambs returned 19s. 6d. per head net; this, with the addition of £5 prize money, is brought to a net return of 26s. 2d. per head. Sired by Southdown rams from Dorset Horn-Merino half-bred ewes.

the long-wool half-bred. For this latter reason a producer specialising in fat-lamb production may be able to meet an early market with lambs from a Dorset-Merino half-bred flock and so gain higher prices than if he were solely dependent upon long-wool Merino half-breds.

PARTICULARS OF WINNING GROUP IN EXPORT COMPETITIONS, 1933.

Breeding.—The lambs were by Southdown rams out of half-bred Dorset Horn-Merino ewes.

Age.—They were dropped between March 15th and 25th, 1933, and slaughtered on June 29th. They were thus approximately 14 weeks old.

Two of the Carcasses taken separately of the Cooper Cup lambs. These lamhs were singled out as conforming closely to ideal weight, finish, and conformation.

Weights.—The highest dressed weight was 36lbs. and the lowest 30lbs., and the average for the group 32.93lbs.

Points in Judging.—They were awarded 98 points in Adelaide and 99 in London, making a total of 197 points out of a possible of 200.

PROGRESS OF THE CALF CLUB MOVEMENT IN THE SOUTH-EAST.

[By W. H. Downes, District Dairy Instructor.]

Sutton Town.

Now that a period of more than two years has elapsed since the first Calf Club was formed in the South-East, it is fitting to make some comment on the progress made and the good work accomplished by the operation of this and various other clubs which were brought into being later on in the district.

With the object of forming a club, the first meeting was convened in the Sutton Town School by Messrs. A. C. Bigham, C. Rogers (Head Teacher), and W. H. Downes on March 21st, 1932. At this meeting the history, operation, and objects of the Calf Club movement were fully explained to a representative gathering of parents and pupils. In order to give the matter full consideration, the meeting was finally adjourned until May 17th in the same year, and on this occasion it was unanimously decided to proceed with the formation of a club.

The first consignment of calves for the Sutton Town Calf Club.

Although a nucleus for the club had been formed several years previously by the generous gift of a pure bred Friesian heifer calf from Mrs. H. Walsgott to James Bigham for proficiency in Home Project Work at the Sutton Town School, it was unanimously decided to adopt the breed of Australian Illawarra Shorthorns as a foundation for the club. By means of donations, public subscriptions, and social functions, together with a handsome donation of £10 specially allocated from the School Funds, sufficient money was raised for the purchase of several pure bred calves.

On June 1st, Mr. A. C. Bigham (President) purchased three heifer calves from Messrs. E. and A. Nicholls, the names of the heifers being "Kiama" Beauty, Pansy, and Daphne, at a cost of 15 guineas each. These were dispatched from Adelaide on July 19th, 1932, but, in addition to the original three, the truck contained five other pure breds. One of these was a bull generously donated to the club by Mr. A. Howard, of Mount Barker, and the remaining four, three bulls and a heifer, were purchased outside the confines of the club. This feature proves of special interest, for it showed that the club's activities had directly influenced others in a desire for well bred stock. The first ballot and distribution of calves took place on July 23rd, when out of five applicants, Masters Aubrey

Wilson, Stuart Bigham, and Ervin Bruhn were successful. Mr. C. R. Wilson, father of the first-named boy, in addition to paying the full purchase price for his son's calf, kindly offered to return a calf to the club. The calves, which were all successfully reared, were inspected from time to time by members of the committee. Two further heifers, "Belalie Gypsy" and "Belalie Fussey's Beauty," were secured from Mr. J. McLean for 11 and 9 guineas respectively, and finally allotted to Masters James Bigham and Jock Creek on February 4th, 1933.

The next allotment took place on April 23rd, 1934, when the heifer progeny of "Kiama Pansy," one of the foundation animals, was returned to the club and received by Master Ron Bruhn. Of the other two original heifers, "Kiama Beauty," returned a bull calf, approved by the committee, to the club, while "Kiama Daphne" produced a heifer, and the latter was successfully ballotted for by Master Ross Bigham on June 18th. A further purchase of two heifers was made from Mr. A. Snell, and Miss Betty Bruhn secured "Illawarra Handsome 13th" and Master Zane Wilson obtained "Illawarra Lady May 4th." In order to supply the demands of all members, the purchase of another heifer from Mr.

Mr. James Bigham presented the cow "Fernleigh Pansy" and her two female progeny to the Sutton Town Club.

Snell is in view, and, in addition, a bull calf will probably be selected for the general use of the club. Altogether this club is now in a very strong position, and, besides having most of its members provided for, has at least £40 in hand and is rapidly becoming more or less self-supporting.

Compton Downs.

News of Sutton Town's progress rapidly spread throughout the district, and the next club was formed on May 3rd, 1932, at a meeting convened by members of the Compton Downs School Committee. The writer again had the pleasure of addressing an enthusiastic audience, and it was decided to promote the Compton Downs Dairy Calf Club. For the efficient working of the club, the rules of the Lower Murray Club were adopted with slight alterations. The committee decided to specialise in Friesians, it being considered that this breed was best suited to local cheesemaking requirements. Mrs. H. Walsgott, the only lady member of the committee, deserves special mention for her offer to present a pure bred Friesian heifer to a selected member of the club. In this, Miss Joyce Pettingill was successful, securing for her special care "Fernleigh Pariora Beauty."

Owing to the efforts of the Secretary, Mr. D. E. Wellington, (Head Teacher, and also Secretary of the Blue Lake Home Project Association at that time), ably assisted by a live committee, the club funds benefited to the extent of £70 by a "Back to Compton" function on December 3rd, 1932. Additional calves for allotment were secured in July the following year, one being "Spring Vale Dulcina Inka" from Mr. A. J. Eldridge, Noorat, Victoria, at a cost of 10 guineas, the other, "Willowvale Collantha Triumph" from Mr. E. W. Patterson, of Long Flat, Murray Bridge, priced at 9 guineas. Mr. Eldridge very kindly redonated 10s. to the club. The two heifers were presented to Masters Alex Dew and Ross Pettingill on July 14th. These three calves have been successfully reared by the members to whom they were allotted, and it is expected that the gift calf will be in milk next November.

The position at this school is that, while ample funds are available for the purchase of more calves, there is a limited number of members of suitable age or with proper facilities to receive a calf and rear it. Possibly, also, the decision of the committee to confine their activities to one breed only has caused a slight limitation of members who would perhaps prefer some other breed. During the

Owners, with their stock, belonging to the Sutton Town Club.

last December staff changes, the Secretary, Mr. D. E. Wellington, was transferred to Moorak School, and the work in connection with this club has been ably conducted by his successor, Mr. R. Mathews.

Moorak.

On May 4th, 1932, a representative gathering of residents and pupils at the Moorak School was addressed by the writer on the advantages and operation of Calf Clubs. The meeting was adjourned until June 7th, when Messrs. A. C. Bigham, C. Rogers, R. Smith, and C. R. Wilson, all of the Sutton Town Club, attended. These gentlemen explained the working of their own club and the success which had attended their efforts to date. The raising of funds, securing suitable stock, and the general operations of a club were discussed fully. A committee was formed, Mr. A. H. Kilsby being elected President and Mr. C. McConnon (Head Teacher), Secretary. Following the drawing up of suitable rules, it was resolved to include good grade, as well as pure bred, calves. With the object of securing calves for the club, several of the leading district breeders and dairymen were approached by various members of the committee, with the result that they received promises of 12 well bred, in some cases pure bred, heifers—a highly satisfactory achievement. Those responsible for sponsoring the movement in this

way were Mrs. H. Wallsgott with a gift of two Friesian heifers; Messrs. R. Smith (Friesian); K. McIntosh (Red Poll); W. Hitchcock (Jersey); A. L. Brown (Shorthorn); A. H. Kilsby (Shorthorn); A. P. Spehr (Jersey); S. Clark (Ayrshire); F. Lock (Jersey); and Messrs. E. W. Tollner and R. S. Taylor each an Ayrshire heifer. The allotment of the 12 animals took place on July 8th, 1933, the following being the recipients:—Ralph Bruhn, Kevin Bruhn, Len Newton, Lindsay Lock, Bernice Friedrichs, Keith Brown, Hartley Kilsby, Ron Hamilton, Bill Clark, Mavis Janeway, Douglas and Alan Ferguson. The rules were finally completed at a committee meeting on July 20th.

On October 7th a Calf Show was held at the school and prizes were given in connection with the rearing and handling of the calves, making due allowance according to the difference in ages. All these calves have now been successfully reared. Moorak is to be congratulated for its enterprise in securing so many calves free of cost, but this was made possible only by the unfailing generosity of the donors.

Three pure-bred Friesian heifers in the Compton Downs Club. The largest heifer was a gift from Mrs. H. Walsgott; the other two were allotted recently.

Glencoe East.

The committee of the Glencoe Home Project Club decided to form a Calf Club on July 19th, but only on condition that calves should be purchased at such time as sufficient funds were available. As a means of raising the necessary funds, a Pet Show and Exhibition of School Work was held at the school on August 24th. The effort realised a net £30 and proved so popular and successful that it was repeated with a similar result one year later. With this amount in hand, an advisory committee was formed to draw up rules and to manage the affairs of the club. Those who were associated in this were:—Messrs. F. Childs, President; R. S. Michelmore (Head Teacher), Hon. Secretary; A. J. Riddle, H. Holloway, W. F. Koop, and W. H. Downes. In October of the same year the committee decided to purchase two pure bred Ayrshire heifer calves from Messrs. W. P. Brisbane and Sons, of Gowrie Park, Weerite, Victoria. The two calves agreed upon were "Gowrie Park Sparkle" and "Gowrie Park Lavinia," both from tested cows which had produced well. They were allotted to Masters Ross Holloway and Harold Cram. The Glencoe Club adopted the policy that, instead of confining their activities to one breed only, the individual breed requirements of each member would be studied and the required breed supplied after a ballot had been

taken. The next purchase was a Friesian (pure bred) from Mr. C. J. Morris, of Monteith, South Australia. This heifer, "Murray Glen Griselda 2nd," was allotted to Ronald Childs on April 2nd, 1933. Had it been anything but a Calf Club purchase, it is very doubtful whether the owner would have been disposed to sell this promising youngster, seeing that the dam produced no less than 621lbs. of butterfat as a senior two year old. The young recipient therfore is an extremely lucky boy. Ever since the boys took possession of their calves, they have fed, cared for, and trained them under the guidance of members of the advisory committee. "Gowrie Park Sparkle" has now calved, and it should not be very long before her mate comes into action.

YAHL.

The inaugural meeting of the Yahl Young Farmers' Club was held on July 19th, 1933. Mr. A. C. Bigham, President of the Sutton Town Club, in company with the writer, attended by invitation. After eulogising the value of club work, a unanimous vote was taken in favour of commencing a club. A committee comprising Messrs. A. W. Kilsby, President, R. C. Rowley, Treasurer, A. Prater

The final presentation of the Glencoe Club's first two Ayrshire calves purchased from W. P. Brisbane & Sons, of Gowrie Park, Weerite, Victoria.

(Head Teacher), Secretary, and Messrs. A. A. Hill, F. W. Button, A. Wicks, S. and F. Norman was elected the same evening. The School Committee donated 7 guineas, while a further gift of 5 guineas was received from the Yahl Co-operative Cheese, Butter, and Bacon Company. The committee decided to specialise in Friesians and the first two heifers were eventually purchased from the Spring Vale Stud, owned by Mr. A. J. Eldridge, of Noorat, Victoria, and included "Lassie Patch," priced at 10 guineas, and "Mona Inka," 15 guineas. Mr. Eldridge very kindly redonated 25s. of the purchase price to the club. The calves arrived on October 2nd, 1933, and were balloted to Miss Joyce Lehman and Miss Betty Hill.

The next calf to be purchased was "Cliffside Double Echo" from Mr. H. F. Kleeman, of Mypolonga, for 7 guineas. A special ballot was held, when Master Errol Button drew first right of refusal. The fourth calf was bought from Mr.

T. H. J. Dodd for 5 guineas. "Glen Murray Crusader's Pride" was allotted to Jack Kilsby. The committee usually arranges for calves to be trucked when but a few weeks old, thus giving the successful members an opportunity of rearing the animals themselves on the best lines under the direction of the club. Lectures are held every quarter on some subject relative to the club's activities, and this, apart from its instructive nature, has become quite a social feature. The policy will be for the club to provide as many calves as possible for the applicants, and it is expected that before very long all members' requirements will be supplied. It is significant that prior to the formation of the Yahl Young Farmers' Club very few Friesians were to be seen amongst the herds of that district; now there seems to be a more general trend in favour of this breed.

MILLICENT.

The youngest district club is of quite recent origin, and was formed in connection with the Millicent School. A decision to form a club was reached on June 21st, 1934, and a week later rules and conditions for governing the club

Committee and successful applicants of the Yahl Young Farmers' Club. In the second row are Ivor Dowdell, Max Crouch, and Tom Hall. In the front row are Cliff Lehmann (with "Lassie Patch") and Betty Hill (with "Mona Luka").

were carefully discussed. At this meeting many kind offers of donations were received. The first calf, a pure bred Illawarra Shorthorn heifer calf, was the generous gift of Mr. A. N. McArthur, of Millicent, and this has since been allotted to Ross Kent. Mr. W. S. McAuliffe, of Eudunda, has also kindly promised a gift to the club of a pure bred Jersey bull calf, about three months old, sired by "Eudunda Merry Mike." In addition, Elder Smith & Co. have graciously offered two 100lb. bags of Meggitt's linseed meal for the feeding of the calves. Donations now totalling 11½ guineas are in hand and the purchase of another pure bred calf is contemplated.

The officers constituting this club are:—President, Mr. G. Major; Vice-Presidents, Messrs. R. DeGaris and H. E. Holtzgrefe; Treasurer, Mr. E. J. Mitchell; and Secretary, Mr. G. W. Downes, who is attached to the staff of the

Millicent School. Since its inception the number of people interested in the movement is steadily increasing, and during its brief existence of approximately three months, the club has obtained a very firm footing.

Objects of the Clubs.

In all, there are now six Calf Clubs operating in the district, but it is anticipated that, in view of the excellent work being accomplished, many more clubs will be added to this number in the not far distant future. One of the principal rules applying to Calf Club management makes it practically imperative for the owner members to display their charges at the nearest district show. The work of feeding, training, clipping, cleaning, and the general show preparation of their animals is of the highest educational value to the youngsters, who take a keen and enthusiastic interest in these duties.

Evidence of this has been well demonstrated at the Mount Gambier Annual Show, and the degree of success attending their efforts has not been confined to the Home Project Section alone, but extends to the open classes against all exhibitors. Accommodation on the local grounds last year had to be extended in order to provide sufficient stalls for the 40 or more entries. It is now anticipated that the entries this year will number between 50 and 60 head, so that this surprising increase is likely to more than tax the present arrangements. Clubs endeavour to cater principally for those children whose final intention is to follow a life on the land. Club work gives them an early interest and training in stock questions such as feeding, handling, training, &c., the costs associated with same, and should prove the means of instilling early in life those qualities that make for competent judges of stock. Records appertaining to the work are regularly and faithfully kept by members; the reading of these accounts becomes a regular feature of club meetings and assists in keeping the interest alive. Local clubs have been extremely fortunate in their selection of club leaders, who, without exception, have generously devoted considerable time and energy in furthering the objects of this worthy cause. The assistance rendered by the Education Department has also proved very valuable, particularly as the duties of Secretary are almost invariably undertaken by the Head Teacher in charge. Mr. A. G. Edquist, Inspector of Rural Education, spends much time on this branch of the work and was responsible for much of the ground work in connection with the preparation of suitable rules for governing club work.

The decision of the various Pure Bred Herd Societies to admit Calf Clubs in an honorary capacity has proved extremely helpful to the clubs concerned. Much valuable advice on breeding has been freely given from time to time by many of the stud breeders; for this gracious act the clubs extend their thanks and their gratitude for the interest displayed by these men. The Department of Agriculture also recognises the high value of club work and is rendering every possible assistance to the movement in this State.

Were it not for the ardent and enthusiastic support so splendidly given by town and country people alike, and which assistance is readily acknowledged, it is very doubtful whether our district Calf Clubs generally would be in the thriving position in which they find themselves to-day. Many of these people have no doubt come to realise that the main objectives of the movement are sound in every respect, that the advantages are many, and the results very far-reaching. That the results will prove of ultimate advantage to the prosperity and advancement of the district seems highly creditable, and this should surely prove a means for considerably improving the general standard of our dairy stock. The attainment of this worthy objective seems not only possible, but capable of early achievement largely through the medium of our district Calf Clubs.

ANALYSES OF ARSENATES OF LEAD.

In response to a request made by local manufacturers for the results of analyses of several Arsenate of Lead Spray Compounds procured by the Department of Agriculture last November, the report of the Director of Chemistry is now published. It reads as follows :—

" The samples of Arsenate of Lead Spray Compounds (11), received on November 3rd (10), and November 8th, 1933 (1), No. 342, have been analysed with the following results :—

No.	Brand.	Moisture.	Total Lead (PbO)	Total Arsenic (As_2O_5)	Water Soluble Arsenic (As_2O_5)
		%	%	%	%
1	" Vallo " Powder	0·43	62·3	30·8	0·18
2	" Aero " Powder	0·57	63·7	31·2	0·13
3	Sherwin Williams Powder	0·23	64·3	32·5	0·43
4	" Lion " Powder	0·34	64·5	30·7	0·51
5	" Lion " Paste	49·9	33·2	15·5	0·17
6	" Palmprest " Powder	0·23	63·8	31·8	0·17
7	" Bluebell " Paste	40·4	38·3	19·4	0·36
8	" Arsinette " Powder	0·75	63·8	31·4	0·37
9	" Blue Bell " Powder	0·32	63·7	33·1	0·25
10	" Elephant " Powder	0·20	63·6	32·9	0·20
11	" Elephant " Paste	46·4	34·3	17·7	0·18

Moisture Free Sample.

Number.	Total Lead (PbO)	Total Arsenic (As_2O_5)	Water Soluble Arsenic (As_2O_5)
	%	%	%
1	62·6	30·9	0·18
2	64·1	31·4	0·13
3	64·4	32·6	0·43
4	64·7	30·8	0·51
5	66·3	31·0	0·34
6	63·9	31·9	0·17
7	64·3	32·5	0·60
8	64·3	31·6	0·37
9	63·9	33·2	0·25
10	63·7	33·0	0·20
11	64·0	33·0	0·34

Suspension Tests.

Number.	Five Minutes.	Thirty Minutes.
	%	%
1	75·5	48·0
2	70·0	50·7
3	24·2	14·1
4	66·3	40·5
5	10·4	5·1
6	18·9	8·5
7	96·5	91·3
8	90·9	86·4
9	79·9	63·2
10	79·5	67·5
11	92·5	74·3

The preparations, with one or two exceptions, show an all round improvement in suspensibility in water, a property of the greatest importance for spraying purposes, as the material remaining in suspension is a true indication of the effectiveness of the spray, and the material settling out of suspension may be regarded as valueless.

STATE OF SOUTH AUSTRALIA.

ORCHARD, VINEYARD, AND MISCELLANEOUS CROP STATISTICS, 1933-34.

[Figures in parentheses refer to previous season.]

[A. W. BOWDEN, Acting Government Statist.]

1. ORCHARDS.

1. *Acreage.*—28,899 (29,109) acres, decrease 210 acres; trees of bearing age 25,640 (25,780) acres. Approximately 964 acres grubbed—mostly in counties Adelaide 418 acres, Hamley 216 acres, Stanley 91 acres, Hindmarsh 35 acres, and Frome 30 acres. New planting 754 acres, was an encouraging feature, chiefly in counties Adelaide 510 acres, Hamley 90 acres, Light 56 acres, and Hindmarsh 30 acres.

2. *Production.*—Generally speaking the crops were an improvement on the previous year, the most notable being:—(*a*) *Apples* 1,002,124 (881,139) bush., an increase of 120,985bush. but 350,140bush. below the record yield of 1,352,264bush. in 1927-28. (*b*) *Oranges* (calendar year 1933), 582,602 (575,046) bush., increase 7,556bush., surpassed the record established the previous year. *Lemons,* 49,028 (40,102) bush. *Other Citrus,* 5,275 (4,420) bush. (*c*) *Pears,* 211,458 (219,576) bush., decrease of only 8,118bush. on the record of 1932-33. (*d*) *Apricots,* 396,993 (331,700) bush., increase 65,293bush., created a record, the previous best being 347,080bush. in 1928-29. (*e*) *Other Fruits*—Plums and prunes 150,539 (182,278) bush., peaches 147,175 (129,908) bush. Details for other fruits are shown in accompanying table.

2. VINEYARDS.

1. *Acreage.*—52,880 (52,479) acres, increase 401 acres; vines of bearing age, 51,042 (51,026) acres. About 869 acres grubbed or died out, chiefly in counties Stanley, 293 acres; Light, 224 acres; Adelaide, 197 acres; River Murray districts, 93 acres; but this was more than counterbalanced by new plantings (about 1,273 acres), chiefly in counties Light, 420 acres; Hamley, 358 acres; Adelaide, 279 acres; and Stanley, 166 acres.

The acreage was described as follows:—For winemaking, 32,451 (33,325) acres; drying, 20,065 (18,668) acres; and table, 364 (486) acres.

2. *Total Grape Yield.*—131,123 (142,917) tons, decrease, 11,794 tons; average per acre of bearing age, 2.57 (2.80) tons. For winemaking, 55,099 (71,885) tons; drying, 75,329 (70,075) tons; and table, 695 (957) tons.

3. *Wine made.*—9,200,000 (12,260,971) gallons, decrease, 3,060,971galls.; and 2,858,307galls. below the average of the previous five seasons, 12,058,307galls.

3. DRIED FRUITS.

1. *Currants.*—160,356 (127,796) cwts.; increase, 32,560cwts.

2. *Raisins.*—Sultanas, 195,119 (200,872) cwts.; decrease, 5,753cwts. on the record yield of the previous season. Other raisins, 54,484 (47,805) cwts.; increase, 6,679cwts.; established a record.

3. *Other Dried Fruits.*—Apricots, 20,623 (18,185) cwts.; plums and prunes, 8,286 (11,540) cwts.; peaches, pears, apples, &c., 12,341 (10,268) cwts.

4. MISCELLANEOUS.

Market gardens, 2,105 (1,896) acres; pumpkins and melons, 310 (341) acres, 1,819 (2,031) tons; tomatoes, 485 (496) acres, 170,292 (174,435) bushels; potatoes, 5,824 (6,454) acres, 19,501 (24,814) tons; onions, 417 (429) acres, 3,008 (3,392) tons; other root crops, 584 (565) acres, 3,216 (3,228) tons; nurseries, 168 (158) acres.

5. Overseas Exports.

The value of the total oversea exports of the products of vineyards and orchards for the year 1933-34 was £1,779,624 (£1,448,915), increase £330,709; the principal items being:—Dried fruits, £822,887 (£612,560); wine, £702,324 (£706,327); apples, £183,698 (£94,460). Complete details of interstate exports are not available, but annually about £600,000 of wine and brandy are exported to the other States.

AREA AND PRODUCTION OF ORCHARDS, VINEYARDS, &c., SEASON 1933-34.

Crop.	Unit of Quantity.	Season 1932-33.	Season 1933-34.	Mean of Five Seasons to 1932-33.
		Area.		
Orchards	Acre	29,109	28,899	29,745
Vineyards	"	52,479	52,880	52,268
Minor crops—				
Potatoes	"	6,454	5,824	5,300
Onions	"	429	417	420
Total Root Crops	"	7,448	6,825	6,325
Market Gardens	"	1,896	2,105	1,670
Pumpkins and Melons	"	341	310	342
Tomatoes	"	496	485	576
Nurseries	"	158	168	153
		Production.		
Orchards—				
Almonds	Cwt.	6,375	5,961	6,268
Walnuts	"	755	812	698
Olives—Berries	"	(1932) 15,241	(1933) 6,840	10,203
Olive Oil	Gall.	(1932) 30,979	(1933) 13,725	19,826
Apples	Bush.	881,139	1,002,124	783,132
Apricots	"	331,700	396,993	294,728
Cherries	"	25,216	40,031	34,755
Figs	"	17,486	17,034	15,902
Nectarines	"	23,541	31,578	25,181
Peaches	"	129,908	147,175	129,125
Pears	"	219,576	211,458	183,043
Plums and Prunes	"	182,278	150,539	151,685
Quinces	"	26,767	22,855	25,216
Oranges	"	(1932) 575,046	(1933) 582,602	465,694
Lemons	"	(1932) 40,102	(1933) 49,028	37,504
Other Citrus	"	(1932) 4,420	(1933) 5,275	4,113
Raspberries	Cwt.	1,367	1,800	1,894
Strawberries	"	2,965	3,040	2,065
Other Bush and Berry Fruits	"	1,617	1,618	1,966
Other Fruits	Bush.	3,754	1,063	2,873
Dried Fruits—				
Apples	Cwt.	603	798	583
Apricots	"	18,185	20,623	15,259
Figs	"	433	376	281
Nectarines	"	748	1,162	787
Peaches	"	3,844	5,047	3,969
Pears	"	4,640	4,958	3,413
Plums	"	1,233	731	1,212
Prunes	"	10,307	7,555	5,546
Vineyards—				
Total Grape Yield	Ton	142,917	131,123	129,511
Wine made	Gall.	12,260,971	9,200,000	12,058,307
Currants	Cwt.	127,796	160,356	152,395
Raisins—Sultana	"	200,872	195,119	168,979
Other	"	47,805	54,484	33,348
Minor Crops—				
Potatoes	Ton	24,814	19,501	19,413
Onions	"	3,392	3,008	3,233
Tomatoes	Bush.	174,435	170,292	157,622

EGGS IN SHELL AND EGG PULP EXPORTS.

[Compiled from Returns Specially Collected from Exporting Merchants.]

The grand total exports for each of the years 1930-31 to 1933-34 were respectively £156,632, £236,095, £342,925, and £358,056. For the last year, 1933-34, exports constituted a record, and showed an increase of £15,131 over the previous year 1932-33, and £201,424 over the year 1930-31.

The grand total exports of eggs in shell and in pulp in terms of eggs in shell is estimated to have been 3,000,000 dozen for 1930-31, 5,200,000 dozen for 1931-32, 7,300,000 dozen for 1932-33, and 7,900,000 dozen for 1933-34.

Compared with the previous year, there was an increased export of 340,000 dozen eggs in shell to oversea countries, and of 240,000 dozen to the other States. A decrease of 900,000lbs. of egg pulp exported to oversea countries was counter-balanced by an increase of 950,000lbs. to the other States.

Practically the whole export of the eggs and pulp to oversea countries is to the United Kingdom, while that of eggs to other States is chiefly to New South Wales, and of pulp to New South Wales and Victoria.

For the first two months of the current year (1934-35) 629,410 dozen eggs have been exported oversea, compared with 451,590 dozen for the same period in 1933-34.

The following are the details for 1933-34 and 1932-33:—

State.	Eggs in Shell.		Egg Pulp.		Total Value.
	Doz.	£	lbs.	£	£
New South Wales (Ex. B. H.)	828,759	32,893	1,441,382	41,526	74,419
Broken Hill	260,963	10,663	17,490	486	11,149
Victoria	158,651	4,972	1,074,137	27,458	32,430
Western Australia	134,167	7,555	92,984	2,664	10,219
Other States	1,110	69	147,525	4,424	4,493
Total Interstate—1933-34	1,383,650	56,152	2,773,518	76,558	132,710
1932-33	1,143,297	54,119	1,817,048	52,214	106,343
Oversea (Direct 1933-34	4,182,986	219,721	204,000	5,625	225,346
1932-33	3,842,870	198,741	1,100,000	37,841	236,582
Grand Total 1933-34	5,566,636	275,873	2,977,518	82,183	358,056
1932-33	4,986,167	252,860	2,917,048	90,055	342,925
Increase	580,469	23,013	60,470	(—)7,872	15,131

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

PINNAROO LINE PRODUCERS' CONFERENCE.

The Annual Conference of Branches of the Agricultural Bureau situated along the Pinnaroo line was held under the auspices of the Parilla Well Branch at Pinnaroo on September 18th.

Mr. C. H. Lloyd presided and the opening address was delivered by Mr. A. J. A. Koch (Member of the Advisory Board of Agriculture). Delegates were present from the Parilla Well, Parilla, Lameroo, Clanfield, and Parrakie Branches.

Messrs. W. J. Spafford (Deputy Director of Agriculture), Dr. A. R. Callaghan (Principal, Roseworthy Agricultural College), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Government Poultry Expert), R. L. Griffiths and P. H. Suter (District Instructors), H. C. Pritchard (General Secretary), and F C. Richards (Assistant Secretray, Agricultural Bureau), represented the Department of Agriculture.

The following papers were read and discussed:—"The Application of locally produced Fuel in reducing Tractor Costs," Mr. E. V. Hammatt (Lameroo); "What of the Farmer of To-morrow?" Mr. M. S. Davis (Pinnaroo); "A Few Ailments Common to Sheep in the Mallee," Mr. R. A. Jenkins (Lameroo); "Breeding and Feeding Pigs for Market," Mr E. A. Davis (Pinnaroo); "Facts that have to be faced during the next Year," Mr. W. J. Morcom (Lameroo).

Departmental officers took part in the discussions and replied to questions.

It was decided that the 1935 Conference should be held at Lameroo.

Mr. C. F. Anderson addressed a combined meeting of the Men's and Women's Branches on the subject, "Poultry Keeping in the Mallee Districts." Delegates were entertained at dinner by the Parilla Well Branch.

A particularly interesting exhibit was staged by Mr. D. Wurfel, of the Parilla Well Branch. This consisted of a collection of wheats in the head, and included varieties from India, Canada, Persia, France, United States of America, Japan, and Egypt.

The evening session was occupied by an address, "Crop Rotations and Live Stock on the Farm," by Dr. A. R. Callaghan.

MURRAY LANDS EAST CONFERENCE.

The Murray Lands East Branches of the Agricultural Bureau held their Annual Conference at Caliph on September 20th.

Mr. S. J. Rundle occupied the chair and Mr. A. J. A. Koch delivered the opening address.

Delegates attended from the Alawoona, Pata, and Taplan Branches, and the Department of Agriculture was represented by Mr. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), R. L. Griffiths and P. H. Suter (District Instructors), H. C. Pritchard (General Secretary) and F. C. Richards (Assistant Secretary).

Papers were read by Mr. A. J. Pengilly (Alawoona), "Bulk Handling of Wheat"; Mr. T. W. Wilson (Alawoona), "Calf Rearing"; and Mr. M. Shannon (Pata), "Fat Lamb Raising."

Conference carried the following resolutions:—"That the Government be asked to make provision for a sheep and wool expert to be attached to the Department of Agriculture"; "That the 1935 Conference be held at Alawoona"; "That some system of co-ordination be brought into operation between the Department of Agriculture and the Farmers Assistance Board in the control of the farmers who are working under the Board"; "That a veterinary surgeon be attatched to the staff of the Department of Agriculture, whose services shall be available to the Branches of the Agricultural Bureau"; "That the farmers of this district desire the co-operation of the Advisory Board of Agriculture and the Farmers Assistance Board in order to obtain justice and security of tenure."

At the evening session Mr. W. J. Spafford delivered an address "The Future of Farming in the Murray Mallee."

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

RIVER MURRAY PRUNING COMPETITIONS.

LANGDON PARSONS TROPHY.

This trophy presented by Mr. W. Langdon Parsons will be awarded to the competitor in district competitions who scores the highest aggregate points in both Tree and Vine Sections during the years 1933, 1934, and 1935. The following table shows the position of the competitors:—

Name.	Branch.	1933.	1934.	Total.	
E. A. Liddicoat	Moorook	548	531	1,079	Winner, 1933
A. Wedd	Mypolonga	538	537	1,075	
C. Curtis	Waikerie	531	538	1,069	
W. E. Rout	Berri	535	533	1,068	
G. Elliott	Waikerie	533	534	1,067	
H. M. Perkins	Berri	528	539	1,067	Winner, 1934
W. Perry	Waikerie	530	533	1,063	
R. Isaacson	Waikerie	539	522	1,061	
C. Boehm	Waikerie	515	538	1,053	
J. G. Beckwith	Berri	524	528	1,052	
W. Vogt	Mypolonga	522	527	1,049	
G. De Vito	Waikerie	526	522	1,048	
W. H. Harris	Berri	509	535	1,044	
L. Battams	Moorook	507	536	1,043	
J. Boehm	Waikerie	521	520	1,041	
L. King	Moorook	502	536	1,038	
R. Bartsch	Moorook	521	517	1,038	
G. Vacca	Waikerie	517	518	1,035	
M. Signeri	Waikerie	526	508	1,034	
W. Boehm	Waikerie	508	524	1,032	
R. Loxton	Moorook	500	526	1,026	
R. Keast	Cadell	508	512	1,020	
E. Prosser	Mypolonga	532	486	1,018	
G. Carmenc	Waikerie	509	504	1,013	
M. Hoffman	Cadell	502	508	1,010	
S. Keast	Cadell	507	502	1,009	
G. Rowley	Mypolonga	521	488	1,009	
A. Milde	Mypolonga	545	—	545	
N. Pethick	Renmark	528	—	528	
W. Hoskin	Berri	524	—	524	
F. Hart	Waikerie	519	—	519	

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during August.	Milk. Per Cow during August.	Milk. Per Cow July to August.	Butterfat. Per Herd during August.	Butterfat. Per Cow during August.	Butterfat. Per Cow July to August.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	6·94	4	1,782½	256·84	564·62	91·53	13·19	29·33	5·13
7/L ..	23	13·19	9,644	419·30	776·77	430·38	18·71	34·72	4·46
7/P ..	25·39	23·39	16,222	638·91	1,203·19	798·37	31·44	59·88	4·92
7/Aa .	25	18·35	13,374	534·96	874·28	571·20	22·85	39·57	4·27
7/Tt .	14·29	11·52	9,809¼	686·45	1,299·02	438·64	30·70	60·02	4·47
7/Uu	26·10	21·74	14,017	537·05	1,068·28	579·55	22·20	45·94	4·13
7/Xx	22	16·87	12,622½	573·75	1,076·56	647·84	29·45	55·60	5·13
7/Bbb	51·19	42·26	29,110½	568·67	1,048·91	1,254·05	24·50	46·99	4·31
7/Ccc	21	13·97	8,051	383·38	719·16	347·29	16·54	31·61	4·31
7/Ddd	13	12·61	8,126½	625·11	1,051·88	404·08	31·08	51·58	4·97
7/Eee	10	9·52	6,234	623·40	1,205·35	301·90	30·19	60·77	4·84
7/Ggg	17	8·84	4,689	275·82	511·96	208·33	12·25	24·20	4·44
7/Hhh	9·65	9·65	6,980	723·31	1,265·96	251·46	26·06	46·64	3·60
7/Iii .	15	4·74	4,863¾	324·23	606·33	183·66	12·24	23·66	3·78
7/Jjj	10·32	9·29	5,412¾	524·46	1,032·46	248·32	24·06	48·80	4·59
7/Kkk	31·77	21	12,221¾	384·68	642·74	565·59	17·80	31·74	4·63
7/Lll	20·74	15·10	9,222	444·64	897·43	465·53	22·45	45·92	5·05
7/Mmm	13	8·42	4,732½	364·04	632·30	232·53	17·89	31·99	4·91
Means	19·74	14·69	9,839·69	498·37	919·10	445·57	22·57	42·79	4·53

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during August.	Milk. Per Cow during August.	Milk. Per Cow December to August.	Butterfat. Per Herd during August.	Butterfat. Per Cow during August.	Butterfat. Per Cow December to August.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	19	16·35	10,762½	566·45	3,893·23	542·15	28·53	192·07	5·04
6/C ..	23	14·39	10,781	468·73	3,918·42	444·59	19·33	166·93	4·12
6/H .	24	19·23	12,991½	541·31	3,628·85	555·61	23·15	175·46	4·28
6/Y ..	15	8·32	3,816	254·40	3,226·04	138·52	9·23	141·77	3·63
6/Ii ..	21	16·42	7,968	379·18	5,490·60	324·89	15·46	235·90	4·07
6/Ll .	26	18·03	7,131¼	274·29	4,102·78	285·08	10·96	156·12	4·00
6/Oo .	20	15·03	10,640¾	532·03	5,202·49	435·87	21·79	237·68	4·10
6/Pp .	15	9·55	4,222½	281·50	4,284·50	225·94	15·06	219·23	5·35
6/Rr	27	15·94	12,333½	456·79	5,871·53	507·17	18·78	246·96	4·11
6/Tt .	21·26	16·81	9,306	437·72	5,643·67	423·80	19·93	252·05	4·55
6/Xx	24·16	18·45	12,459½	515·71	4,969·20	500·35	20·71	215·39	4·02
6/Zz..	28·65	21·90	11,308	394·69	4,736·97	535·58	18·69	225·85	4·74
6/Bbb	23	18·65	14,877	646·82	5,161·18	616·38	26·80	229·21	4·14
6/Ccc	21	15·35	11,354¾	540·69	4,361·39	448·85	21·37	186·99	3·95
6/Ddd	23·23	14·61	9,552½	411·21	5,267·36	417·03	17·95	220·79	4·37
6/Eee	27·42	18·32	16,172½	589·80	5,932·53	630·59	23·00	243·25	3·90
6/Fff	24	17·68	11,981¼	499·23	5,746·72	440·99	18·37	239·61	3·68
6/Ggg	27·52	22·19	12,944¾	463·37	5,993·23	549·88	19·73	228·35	4·26
6/Iii .	25	22·03	11,153½	446·14	6,124·40	419·08	16·76	253·45	3·76
6/Jjj	24·97	18·71	15,299	612·68	4,861·65	640·02	25·63	229·37	4·18
6/Kkk	36·90	29·74	19,658½	532·75	6,034·40	810·21	21·96	238·73	4·12
6/Lll	24	17·65	10,988½	457·85	4,372·00	446·81	18·62	201·35	4·07
6/Mmm	10	10	10,369½	1,036·95	May-Aug. 3,266·93	396·02	39·60	May-Aug. 122·62	3·82
Means	23·09	17·19	11,220·52	485·91	5,048·28	466·76	20·21	218·15	4·16

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk	Milk.			Butterfat.			Average Test.
			Per Herd during August.	Per Cow during August.	Per Cow October to August.	Per Herd during August.	Per Cow during August.	Per Cow October to August.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	35·42	32·06	19,113½	539·59	5,051·49	936·15	26·43	265·56	4·90
5/D ..	32·06	27·55	15,373	479·50	4,521·29	753·62	23·51	241·50	4·90
5/E ..	39	30·94	21,465½	552·61	4,559·55	1,112·85	28·63	240·21	5·22
5/P ..	36	31·23	27,357	759·91	6,900·81	1,251·48	34·76	330·75	4·57
5/R ..	68·45	57·84	44,031½	634·26	4,124·84	1,847·60	26·99	174·88	4·20
5/S...	16	13·48	5,437½	340·16	4,989·51	289·07	18·09	245·74	5·30
5/Ee .	23·29	20·65	13,967½	599·72	5,030·84	609·26	26·16	244·39	4·36
5/Gg .	13	10·45	4,174	321·07	3,768·34	204·49	15·73	185·03	4·90
5/Kk	17	11·23	6,529½	384·08	5,431·89	316·50	18·62	260·13	4·85
5/Nn	17	14·23	9,711	571·23	4,964·64	447·95	26·35	239·95	4·61
5/Qq .	15	12·19	6,621	441·40	3,798·39	303·06	20·20	191·54	4·60
5/Rr	22·42	18·90	6,885	307·09	3,181·06	342·45	15·27	170·14	4·97
5/Ss .	17	14·65	8,113	477·24	3,622·23	406·23	23·89	181·14	5·01
5/Tt .	12	5·03	3,432½	286·04	5,389·76	167·74	13·98	273·73	4·89
5/Vv .	21	21	19,282	918·19	5,554·53	807·05	38·43	235·04	4·19
5/Ww	21·06	21·03	11,512	546·62	4,509·02	527·98	25·07	207·78	4·59
5/Xx	20	20	11,067	553·35	4,501·36	520·54	26·03	217·69	4·70
5/Yy	13	9·87	4,664	358·76	3,904·49	271·65	20·90	201·96	5·82
					Nov.-Aug.			Nov.-Aug.	
5/Zz..	28	12·03	7,358¾	262·81	3,722·74	254·44	9·09	140·25	3·46
5/Aaa	18	13·16	10,139	561·75	3,659·66	543·01	30·04	187·24	5·20
5/Bbb	17	10·13	5,724½	336·73	3,078·54	297·24	17·48	158·41	5·19
					Jan.-Aug.			Jan.-Aug.	
5/Ccc	13	11·81	4,954	381·07	1,882·37	223·45	17·19	86·05	4·51
Means	23·40	19·07	12,132·39	518·58	4,570·71	565·17	24·16	219·91	4·66

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during August.	Per Cow during August.	Per Cow March to August.	Per Herd during August.	Per Cow during August.	Per Cow March to August.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	25·16	23·16	12,179	484·06	2,895·57	664·70	26·42	157·85	5·46
9/B ..	14·94	13·23	5,883	393·77	2,352·59	313·02	20·95	111·32	5·32
9/C ..	11·39	9·35	6,296½	552·81	2,241·86	293·61	25·78	101·42	4·66
9/D ..	24·32	22·16	12,381	509·08	3,075·17	701·36	28·84	165·78	5·66
9/E ..	18·84	10·19	5,766	155·99	2,257·09	287·53	8·24	106·40	4·99
9/F ..	18·97	15·81	13,525	712·97	2,765·05	558·81	29·46	114·26	4·13
9/G ..	33·45	17·13	12,361	369·53	2,227·55	663·45	19·83	120·10	5·37
9/H .	19·52	15·58	14,554	745·58	3,633·49	600·08	30·74	152·68	4·12
9/I ..	36	21·48	14,511	402·08	1,306·95	602·47	16·74	54·01	4·15
9/J...	60·06	40·32	18,991	287·50	1,636·71	804·89	12·11	73·27	4·24
9/K .	22·65	16·71	6,359½	280·77	1,578·70	293·74	12·97	78·54	4·62
9/L ..	29	20·48	13,695	414·95	1,979·98	555·65	16·91	77·23	4·06
9/M .	16·10	1·10	226½	14·06	72·97	10·66	·66	3·61	4·71
9/N ..	37	30·71	19,001	513·54	2,697·93	757·39	20·47	109·73	3·99
9/P ..	48·74	41·94	23,909	490·54	1,888·09	1,060·53	21·76	87·34	4·44
9/O ..	24	15·16	14,025¼	584·39	2,010·41	602·90	25·12	92·09	4·30
					Ap.-Aug.			Ap.-Aug.	
9/Q ..	17·97	13·48	5,258	292·60	2,013·29	266·96	14·86	100·09	5·08
9/R ..	9	4·45	3.595	399·44	1,000·11	167·12	18·57	51·75	4·65
					May-Aug.			May-Aug.	
9/S...	11·10	6·90	6,182	553·04	1,549·87	260·95	23·34	68·17	4·24
9/T ..	13·45	13·23	8,679	645·27	2,319·78	393·35	29·25	105·37	4·53
9/U ..	15·77	11·55	5,473	347·05	1,463·78	272·32	17·27	77·75	4·98
					June-Aug.			June-Aug.	
9/V ..	10	8·97	3,977½	397·75	1,124·95	200·85	20·09	58·25	5·05
Means	23·52	16·95	10,310·39	438·38	2,163·00	469·65	19·97	100·80	4·56

THE IMPORTANT PASTURE PLANTS OF SOUTH AUSTRALIA CONSIDERED AS TO THEIR IDENTIFICATION AND CHARACTERISTICS.

[By E. M. HUTTON, B.Ag.Sc., Field Officer.]

(*Continued from page* 189.)

12. DROOPING-FLOWERED CLOVER (*Trifolium cernuum*).

This is a hairless, prostrate, annual clover, with hollow stems, and the three small leaflet stalks are equal in size as in other true Clovers. The stipules are membranous, with purple veins, the stipule points being green and often divided into two portions. The small pink flowers are borne in small loose heads on long slender flower stalks. The clover takes its name from the ultimate reflexed position of the flowers when the seed is being formed. (See Fig. 35.) The small yellow seeds of this clover can easily be confused with those of Clustered Clover (*Trifolium glomeratum*).

T. C. Dunne and C. A. Gardner, writing in the *Western Australian Journal of Agriculture*, March, 1933, described Drooping-flowered Clover as follows:—"It has become one of the most important clovers in the wetter portions of the State. Like Subterranean Clover, it makes a good stand on virgin soil, but it will thrive in situations which are not sufficiently well drained for Subterranean Clover. Under suitable conditions it is at least as prolific as Subterranean Clover, has less coarse stems, and is probably more palatable to stock. Moreover, it shows considerable resistance to the ravages of the Clover Springtail and Red-legged earth mite—two pests which have played such havoc in many established pastures of Subterranean Clover. Chemical analyses show that the clover is highly nutritious and similar to Subterranean Clover in composition."

This clover makes its maximum growth during September and October, and matures in November. It sheds its seed very freely after maturity. The seed is inedible, and a high percentage are "hard seeds," which will not germinate in one season. Drooping-flowered Clover will only thrive in wet situations which retain moisture well into late spring. Like Strawberry Clover, it will withstand periods of inundation. Under ideal conditions a thick mat of clover up to 18in. high could be expected.

In South Australia this clover would do well in wet situations in the Adelaide Hills and the South-East. At present it occurs naturally only in the wetter portions of the South-East. Western Australia supplies most of the seed used in Australia.

II.—THE MEDICS.

As mentioned previously, both the Medics and Melilots have the central leaflet stalk longer than the other two which are equal. (See Fig. 25, August issue.) A Medic can easily be distinguished from a Melilot by crushing between the fingers, when it will be noticed that a Medic is practically odourless, while a Melilot emits a sweetish scent, due to the presence of a large percentage of a substance called cumarin. In the Medics the flowers are usually yellow, and the seed pods are curved or spirally coiled. The stipules are green and leaf-like.

1. LUCERNE (*Medicago sativa*).

This has been fully described in Bulletin 246 by W. J. Spafford, Deputy Director of Agriculture. Lucerne is easily the most valuable and widely cultivated Medic. In South Australia Hunter River Lucerne is the common one used. Such names as Broadleaf Giant Upright Lucerne and others are trade names for Australian Hunter River Lucerne. Genuine seeds of other strains, such as Grimm, Chinese,

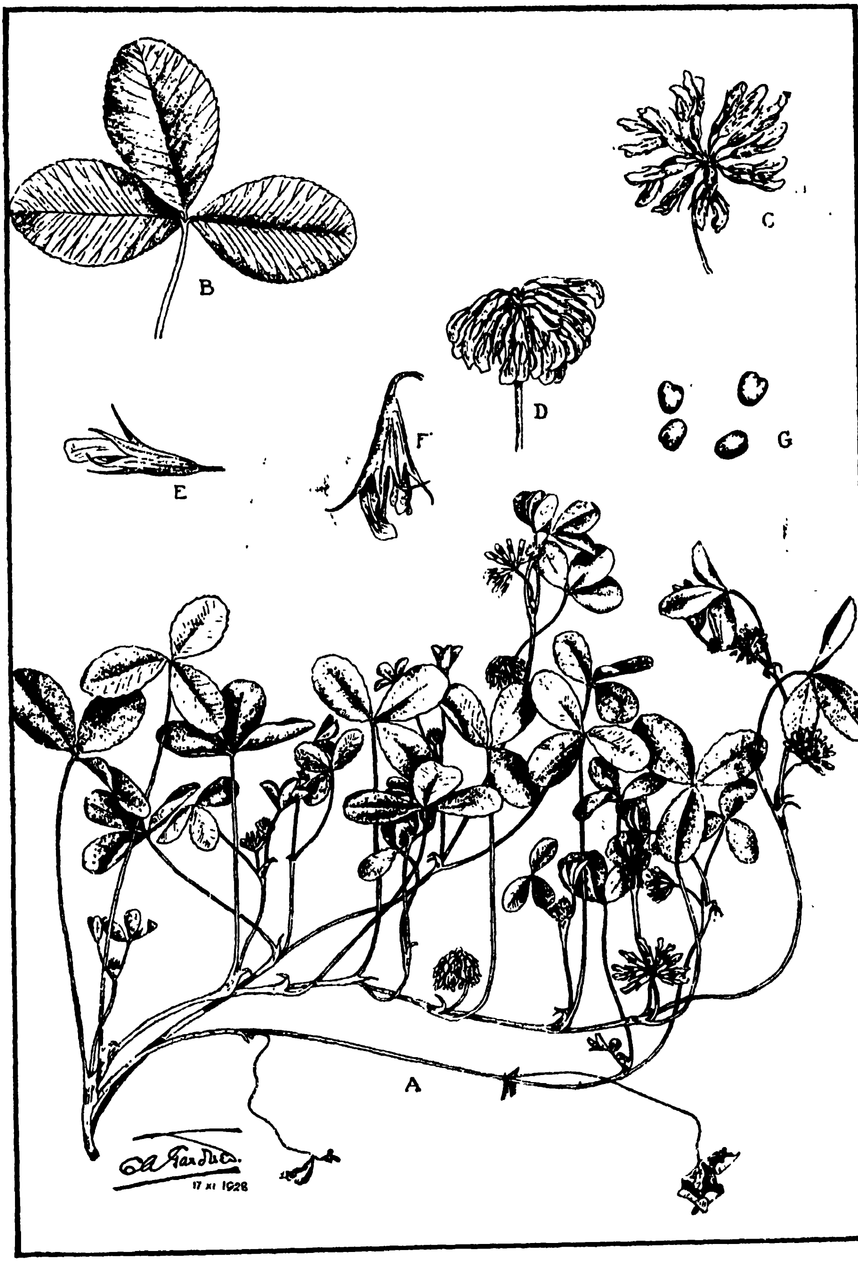


Fig. 35. Drooping-flowered Clover (*Trifolium cernuum*). A. Portion of plant showing ascending habit (½ natural size); B. leaf (natural size); C. flowering head (natural size); D. fruiting head (natural size); E. flower x 4; F. fruiting calyx x 4; G. seeds x 4.

French Provence, and Hairy Peruvian Lucerne are unobtainable in Australia at the present time, "owing to the duty of 9d. per lb. on imported lucerne seed, combined with the primage, sales tax, and the high rates of overseas exchange (25½ per cent.), as well as the fact that all imported lucerne seed has to be stained with rouge before being allowed to enter the Commonwealth" (Brunning's Pasture Book, 1933-34). Mr. Spafford, in his Bulletin, says that "at present it appears that the only type not well-known in the country likely to do as well or better than Hunter River would be Hairy Peruvian."

Lucerne is a sparsely hairy, erect, woody perennial, with the stems arising from the crown, situated at the ground surface. The middle leaflet stalk is longer than the other two equal ones. (See Fig. 36.) The dark-green leaflets, which are toothed at the summit, vary between long narrow and short rounded ones. The stipules are membranous at the base, and possess a green margin and acute green points.

Fig. 36. Australian Lucerne, showing flower-heads opening and in full bloom and seed-heads with some of the seeds just colouring.

[*From "Lucerne Growing in South Australia," by W. J. Spafford.*]

The violet flowers occur in loose clusters. The male (stamens) and female (stigma) parts of the flower lie hidden in the keel, which consists of two petals joined together, and which occupies a position at the centre of the flower. At a certain stage of maturity, or through the agency of bees or other insects, the keel "trips" or breaks open, and the stigma with the attached stamens is shot out. Pollination is then able to occur. It is possible for self-pollination to occur while the stamens and stigma are still enclosed in the keel. Ordinary cross pollination

is much more effective than self-pollination in producing lucerne seed. The seed pods, which contain from two to six kidney-shaped seeds, are twisted spirally into two to four loose coils, open through the centre.

Lucerne is the most drought-resistant legume because of its deep tap-root system, which often penetrates to a depth of 30ft. The main requirements for successful lucerne cultivation are underground water 4ft. to 12ft. from the surface, or an abundance of good irrigation water, good drainage, high average annual temperatures, and sufficient lime and phosphate.

In general, the Adelaide Hills and much of the South-East are unsuitable because of low winter temperatures, the tendency to water-logging in winter, the relatively short growing period, and the abundance of Lucerne Flea. Lucerne roots will not survive below the watertable, because they are not able to respire there. Lucerne thrives in our drier districts, especially where underground water is near the surface, as on the Booborowie flats.

2. BURR MEDIC (*Medicago denticulata*).

Next to Lucerne, this is the most important Medic in South Australia. It is a hairless prostrate annual, with the central leaflet stalk longer than the other two equal ones. A black marking is sometimes present at the base of the leaflets. The

Fig. 37. Burr Medic (*Medicago denticulata*).

[*Leaflet No. 6, N.Z. Dept. Agric.*]

leaflet margins are toothed, and the green stipules are strongly toothed. The loose clusters of two to five small yellow flowers arise in the angle between the leaf and stem. (See Fig. 37.) The seed pods are spirally twisted, the coils being pressed together and provided with hooked spines on the edges, forming the burr which is so troublesome in wool. It owes its wide distribution in the cereal cultivation belt to the nature of its burr, which is easily carried by stock.

It thrives on soils rich in lime, and where the winters are short and mild. It will not grow well where the winters are too long, or where the spring temperatures are too low. It is able to grow in drier situations than other clovers, because

the burrs hold the water a long time once they are saturated, enabling the young seedlings to become established, and because they flower in August and mature early before the hot, dry weather. In a mallee rotation Burr Medic is important in building up the fertility of the soil in the pasture year.

In some years, when climatic conditions are suitable, Burr Medic springs up in great profusion in our Northern districts and Yorke Peninsula. When such a crop is obtained it could be conserved as ensilage. If left, it dies in November and December, and leaves the land strewn with burrs, which provide excellent and often the only sheep feed during the summer months.

3. BARREL MEDIC (*Medicago tribuloides*).

This is a prostrate annual, which may be mistaken for Burr Medic. It differs from Burr Medic in having dark-green, densely hairy leaflets, which are coarsely toothed at the summit. In addition, it has cylindrical burrs, the spines of which are not hooked. It is common in the settled districts, and appears to be becoming as abundant as Burr Medic on the Adelaide Plains.

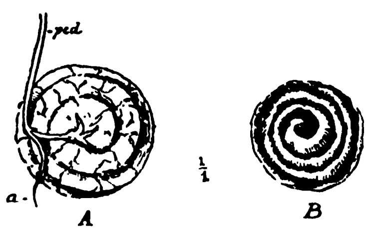


Fig. 38. Showing seed pods of—
A—Button Medic (*Medicago orbicularis*)
B—Snail Medic (*Medicago scutellata*).
[*From Black's "Flora of South Australia."*]

4. SPOTTED MEDIC (*Medicago arabica*).

This is a prostrate, hairless annual, very similar to Burr Medic, except that each of the leaflets are marked with a brown spot in the centre, and the burrs are larger. It is rare near Adelaide, and is commoner in the South-East, being more adapted to temperate conditions.

5. BUTTON MEDIC (*Medicago orbicularis*) and SNAIL MEDIC (*Medicago scutellata*).

The common names of these two Medics are descriptive of the shape of their spineless, straw-coloured seed pods. In Button Medic the pods are flattened and circular, while in Snail Medic the pods are hemispherical, the coils being vertical. (See Fig. 38 A and B.)

They are only found in localised patches in the better districts, because they are less hardy than Burr Medic, and also lack spines, which are the main natural means of spread. Stock tend to eat out these two Medics, because they possess large, very palatable seeds.

Both are prostrate annuals, with entire fleshy stipules. Button Medic is hairless, and possesses smaller leaves than the very hairy Snail Medic.

III.—THE MELILOTS.

They have the central leaflet stalk longer than the other two equal ones, and can be readily distinguished from the Medics by the sweetish scent of cumarin, which they emit when crushed.

Fig. 39. Bokhara Melilot (*Melilotus alba*).

[*From "Grasses and Fodder Plants, N.S.W.," by E. Breakwell.*]

1. KING ISLAND MELILOT, YELLOW MELILOT, HEXHAM SCENT, or CALIFORNIAN LUCERNE (*Melilotus indica*).

This is a hairless, erect annual, and tends to become woody at maturity. The leaflets are toothed near the summit, and the stipules are very small. The small yellow flowers are arranged in long dense clusters. The small pods are one-seeded.

In South Australia it is common on cultivated land and along roadsides. It seems to prefer habitats near the sea, as it is a common weed on the calcareous soils of Yorke Peninsula, and is often found on sandy soil not far from the sea. Also, it had a definite value on King Island, where it converted a barren waste into a fertile and productive piece of country. Stock have to acquire a liking for this relatively unpalatable fodder.

It is an unwelcome impurity in both lucerne hay and wheat because of the odour imparted by the cumarin. W. R. Jewell, in the August *Victorian Journal of Agriculture*, comes to the conclusion that:—

1. Wheat milled with a very small admixture of Melilotus seed produces a tainted flour, the taint persisting in the final loaf.

Fig. 40. Minor Birdsfoot Trefoil (*Lotus corniculatus*). [*After Fream.*]

Fig. 41. Common Vetch (*Vicia sativa*). [*From Black's "Flora of S.A."*]

2. Damp wheat with upwards of 2 per cent. Melilotus, when stored for some time, may yield a tainted flour, even when the Melilotus is separated prior to milling. This does not occur if the wheat is dry.

2. BOKHARA MELILOT or WHITE MELILOT (*Melilotus alba*).

This is an erect, hairless biennial, which becomes decidedly woody. Under favourable conditions it will act as a perennial. It has the usual Melilot characters, and has the white flowers arranged in very long, loose clusters. (See Fig. 39.)

As with King Island Melilot, stock have to acquire a liking for it because of the bitter taste imparted by the cumarin. However, it is much more palatable than King Island Melilot; also, it is a good soil renovator.

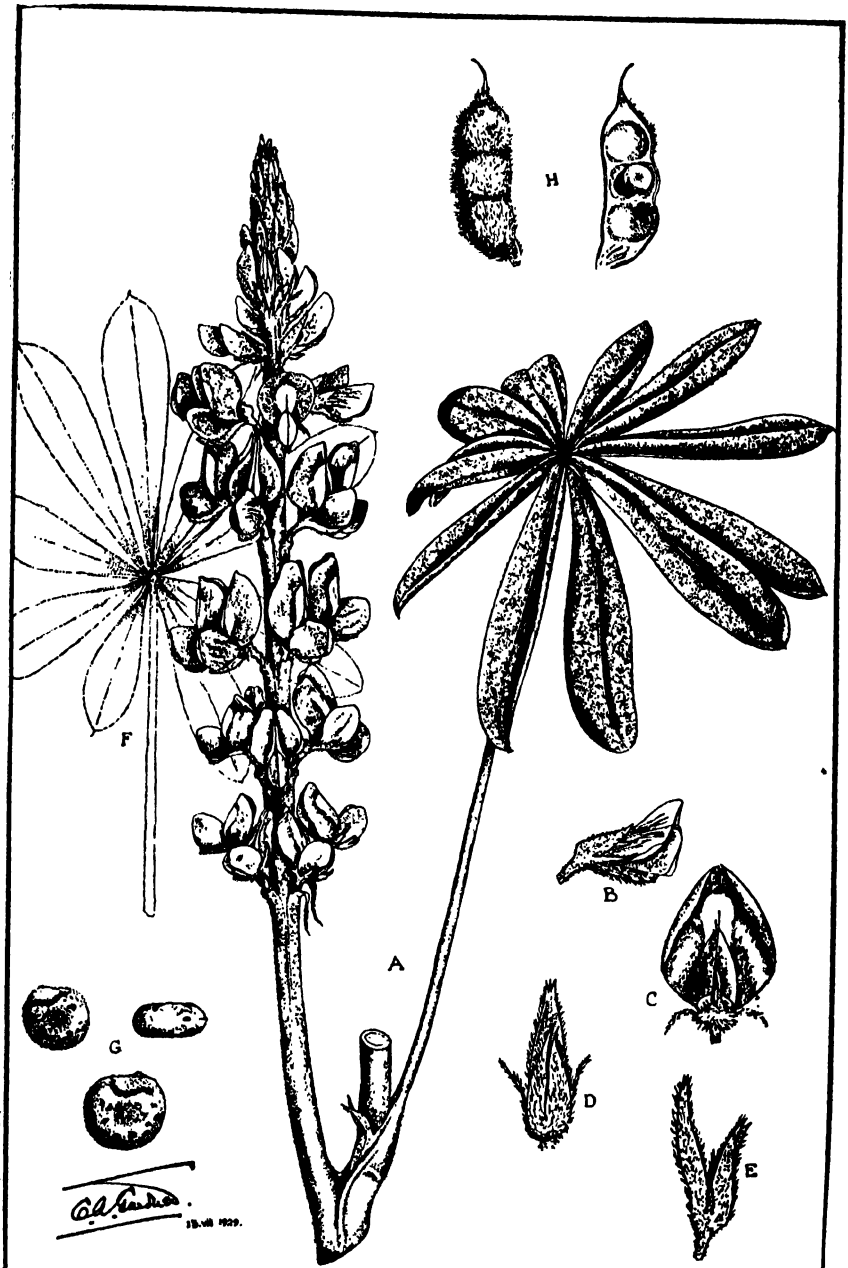


Fig. 42. Western Australian Blue Lupin (*Lupinus pilosus*). A. Flowering raceme and leaf (½ natural size); B. flower (½ natural size); C. flower (¾ natural size); D. and E. calyx—D. from below, E. side view (1½ natural size); F. leaf (½ natural size); G. seeds (natural size); H. seed pod (½ natural size).

[*C. A. Gardner and H. G. Elliott, "W.A. Journ. Agric.," Sept.*, 1929.]

IV.—THE BIRD'S-FOOT TREFOILS.

As mentioned before, these plants possess five leaflets, three of which are close together at the summit of a short leaf-stalk, the other two being at the base and taking the place of the stipules, which are absent. These legumes derive their common name from the fact that the long straight mature pods radiate from the top of a stalk, the arrangement resembling a bird's foot.

The best known Bird's-foot trefoils are Greater Bird's-foot Trefoil (*Lotus major*), Minor Bird's-foot Trefoil (*Lotus corniculatus*), and Boyd's Trefoil (*Lotus angustissimus*). They all make their maximum growth in the summer. The first two are perennials, while the last one is an annual.

Lotus major only thrives under swampy conditions; in fact, it is restricted to soils which retain a considerable amount of moisture close to the surface during the summer months. It is an important swamp species in New Zealand, Victoria and Tasmania, and would thrive in our South-Eastern swampy country.

Lotus corniculatus (see Fig. 40) is much hardier than *Lotus major*, and will produce summer growth under comparatively dry conditions. It occurs naturally in the South-East and Mount Lofty Ranges.

Lotus angustissimus is also a summer grower, and would require summer moisture.

V.—THE VETCHES, OR TARES.

Common Vetch (*Vicia sativa*) is a climbing, hairy annual common on the Adelaide Plains, especially in unstocked natural pastures. It has four to seven pairs of leaflets and branched tendrils. (See Fig. 41.) The flowers are purplish outside and reddish in the centre. The straight pods usually contain eight to ten seeds. Common Vetch soon disappears under grazing, because once the single stem is bitten off at the base the plant dies.

VI.—THE LUPINS.

The Lupins are hairy annuals with at least five folded leaflets radiating from the summit of a single leaf stalk. The common Western Australian Blue Lupin (*Lupinus pilosus*) has nine to eleven leaflets radiating from the summit of each leaf stalk (see Fig. 42); while in another common Blue Lupin (*Lupinus hirsutus*) there are usually five to seven radiating leaflets. The blue flowers are arranged in long clusters.

Lupins grow best on dry sands and light sandy loams. They do not grow well on light calcareous soils. Lupins are exceptionally rich in nitrogenous compounds, and considerably enrich poor sandy soils when ploughed in.

In Europe and America it is not regarded as a fodder plant; in fact, it is described as a poison plant. Stock will not eat the lupin in a green condition if there is an abundance of other green feed, because the plants contain a proportion of a bitter alkaloid, which makes them unpalatable. Under certain conditions of soil, manuring, and storage of green fodder a poisonous substance lupinotoxine is developed, which produces fatal results in stock.

In the summer months the shed lupin seeds are relished by stock, and provide a fattening food. It has been estimated in Western Australia that a lupin paddock will carry and fatten up to four sheep per acre in the summer.

In South Australia very little use is made of lupins. They are found growing in certain sandy localities as along the coast west of Adelaide.

(*To be continued.*)

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
	1	118	
	2	104	
A. J. Hill, Sunraysia	3	29	251
Poultry Farm	4	—	
Greensborough,	5	99	
Victoria	6	86	185
			436
	7	92	
	8	108	
	9	105	305
A. H. Matthews,	10	107	
Bridgewater	11	dead	
	12	45	152
			457
	13	93	
	14	27	
	15	103	223
G. W. T. Symes,	16	65	
Echunga	17	88	
	18	95	248
			471
	19	115	
	20	74	
	21	dead	189
E. B. Gliddon,	22	dead	
Yundi	23	79	
	24	44	123
			312
	25	108	
	26	56	
	27	73	237
T. Cleaver,	28	84	
Bridgewater	29	87	
	30	97	268
			505
	31	88	
	32	85	
	33	61	234
J. E. Assender,	34	69	
Echunga	35	81	
	36	55	205
			439
	37	95	
	38	76	
	39	145	316
S. Hill,	40	112	
Bridgewater	41	13	
	42	71	196
			512
	43	127	
	44	121	
	45	59	307
W. Restall,	46	84	
Echunga	47	81	
	48	110	275
			582
	49	93	
	50	118	
	51	89	300
C. Guthridge	52	14	
Yundi	53	49	
	54	75	138
			438
	55	92	
	56	28	
	57	dead	120
S. Lambert,	58	35	
Echunga	59	70	
	60	61	166
			286
	61	86	
	62	115	
	63	71	272
A. Young,	64	95	
Bridgewater	65	79	
	66	106	280
			552
	67	100	
	68	81	
	69	100	281
D. J. Foxwell,	70	68	
Echunga	71	96	
	72	39	203
			484
	73	67	
	74	97	
	75	93	257
J. C. Normandale,	76	98	
Yundi	77	98	
	78	102	298
			555
	79	121	
	80	50	
	81	83	254
L. W. Sando,	82	107	
Echunga	83	125	
	84	72	304
			558
	85	108	
	86	133	
	87	52	293
J. O. Marshall,	88	dead	
Yundi	89	92	
	90	69	161
			454
	91	72	
	92	92	
	93	102	266
Murray Powell,	94	dead	
Jupiter Creek	95	103	
	96	64	167
			433

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934	
	97	100	
	98	109	
	99	96	305
S. Bridge,	100	47	
Yundi	101	dead	
	102	100	147
			452
	103	68	
	104	62	
	105	106	236
C. T. Rodger,	106	94	
Echunga	107	103	
	108	38	235
			471
	109	25	
	110	12	
	111	114	151
R. H. Smith,	112	21	
Yundi	113	94	
	114	18	133
			284
	115	33	
	116	69	
	117	99	201
Willow Bend Stud	118	—	
Poultry Farm,	119	45	
North Walkerville	120	68	113
			314
	121	28	
	122	78	
	123	111	217
C. MacDonald,	124	110	
Echunga	125	92	
	126	96	298
			515
	127	122	
	128	82	
	129	113	317
T. R. Smart	130	75	
Yundi	131	dead	
	132	123	198
			515
	133	61	
	134	74	
	135	92	227
Raymoor Poultry Farm,	136	104	
William Street.	137	91	
Kilkenny	138	38	233
			460
	139	58	
	140	111	
	141	136	305
B. R. Whittington,	142	53	
Yundi	143	64	
	144	90	207
			512
	145	2	
	146	119	
	147	68	189
W. A. Hazeal,	148	36	
11, Rosetta Street,	149	74	
Rosewater	150	dead	110
			299

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
	151	40	
	152	78	
	153	54	172
H. F. Muirson,	154	54	
Yundi	155	113	
	156	73	240
			412
	157	3	
	158	94	
	159	89	186
K. Pennack,	160	115	
Pooraka	161	74	
	162	90	279
			465
	163	85	
	164	86	
	165	111	282
C. A. L. Sandstrom,	166	106	
Yundi	167	104	
	168	42	252
			534
	169	33	
	170	36	
	171	66	138
G. A. Bielby,	172	98	
Pooraka	173	96	
	174	85	279
			417
	175	79	
	176	61	
	177	103	243
W. M. Field,	178	37	
Yundi	179	71	
	180	101	209
			452
	181	117	
	182	119	
	183	100	336
T. Duhring,	184	115	
Mallala	185	79	
	186	90	284
			620
	187	105	
	188	dead	
	189	36	141
W. R. Hedger,	190	77	
Yundi	191	123	
	192	—	200
			341
	193	91	
	194	100	
	195	92	283
A. & H. Gurr,	196	110	
Bradbury	197	126	
	198	104	340
			623
	199	95	
	200	86	
	201	72	253
J. V. McGinnis,	202	57	
Yundi	203	62	
	204	16	135
			388

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	114	
	206	87	
	207	115	316
	208	74	
	209	58	
	210	116	248
			564
W. C. Jones, Yundi	211	7	
	212	78	
	213	112	197
	214	94	
	215	89	
	216	27	210
			407
Langmaid & Bettison, Parafield, Salisbury	217	66	
	218	81	
	219	32	179
	220	73	
	221	103	
	222	82	258
			437
A. Jarvis, Yundi	223	65	
	224	67	
	225	45	177
	226	99	
	227	82	
	228	108	289
			466
S. Eyles, Clarendon	229	49	
	230	dead	
	231	100	149
	232	103	
	233	104	
	234	78	285
			434
Woodbury Poultry Farm, Stirling East	235	83	
	236	17	
	237	84	184
	238	dead	
	239	44	
	240	61	105
			289
V. F. Gameau, Findon Road, Woodville	241	54	
	242	6	
	243	67	127
	244	dead	
	245	72	
	246	71	143
			270
Geo. Lomax, Yundi	247	84	
	248	23	
	249	76	183
	250	55	
	251	dead	
	252	69	124
			307
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	82	
	254	123	
	255	52	257
	256	20	
	257	11	
	258	27	58
			315

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
W. R. Williams, 28, Avenue Road, Frewville	259	131	
	260	66	
	261	5	202
	262	114	
	263	112	
	264	116	342
			544
R. W. McAllister, Yundi	265	66	
	266	46	
	267	93	205
	268	49	
	269	112	
	270	75	236
			441
G. W. Sykes, Yundi	271	62	
	272	67	
	273	81	210
	274	109	
	275	90	
	276	80	279
			489
A. P. Urlwin, Balaklava	277	106	
	278	89	
	279	105	
		300	
A. V. Dupen, Melton Street, Glenelg	280	87	
	281	130	
	282	56	
		273	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	77	
	284	129	
	285	76	
		282	
Thomas & Elson, Clifton Street, Hawthorn	286	75	
	287	47	
	288	86	
		208	
J. H. Dowling, Glossop, River Murray	289	76	
	290	102	
	291	95	
		273	
E. Pape, Wynarka	292	—	
	293	27	
	294	52	
		79	
L. S. Ekers, Mount Jagged Farm Mount Compass	295	87	
	296	83	
	297	83	
		253	
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	92	
	299	104	
	300	116	
		312	
L. R. Badcock, 77, Findon Road, Woodville	301	57	
	302	62	
	303	84	
		203	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	93	
	305	94	
	306	120	
		307	
Gallagher & Aslin, Pooraka	307	128	
	308	92	
	309	80	
		300	
R. C. Crittenden, William Street, Kilkenny North	310	98	
	311	76	
	312	69	
		243	
C. H. Lines, Junr., Gladstone	313	94	
	314	86	
	315	92	
		272	
A. J. Monkhouse Woodside	316	105	
	317	40	
	318	47	
		192	
B. Cooke, Kanmantoo	319	131	
	320	128	
	321	115	
		374	
Gallagher & Aslin, Pooraka	464	90	
	465	109	
	466	97	
		296	
The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.			
W. C. Slape, Magill	467	64	
	468	81	
	469	89	
		234	
Willow Bend Stud Poultry Farm, North Walkerville	474	127	
	475	7	
	476	98	232
	477	72	
	478	130	
	479	130	332
			564
Total Class 1. . . .		25,476	
Class 2.—Any Other Light Breeds.			
M. O. & O. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	55	
	323	5	
	324	30	
		90	
G. Frisby Smith, Fulham (Minorcas)	325	—	
	326	79	
	327	87	
		166	

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934	
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	41	
	329	97	
	330	77	
		215	
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	57	
	332	113	
	333	95	
		265	
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	26	
	472	81	
	473	102	
		209	
Total Class No. 2.		945	
Class No. 3.—Black Orpingtons.			
H. J. Mills, 108, Edward Street Edwardstown	334	112	
	335	92	
	336	108	312
	337	104	
	338	122	
	339	149	375
			687
A. G. Dawes Portrush Road, Glenunga Gardens	340	140	
	341	50	
	342	102	292
	343	77	
	344	84	
	345	100	261
			553
Willow Bend Stud Poutry Farm, North Walkerville	346	123	
	347	106	
	348	80	309
	349	84	
	350	35	
	351	33	152
			461
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	86	
	353	74	
	354	103	263
	355	54	
	356	109	
	357	82	255
			518
A. C. Byrne, 114, Rose Terrace, Wayville West	358	102	
	359	93	
	360	67	262
	361	79	
	362	45	
	363	72	196
			458
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	102	
	366	112	
		252	
C. H. Lines, jun. Gladstone	367	101	
	368	57	
	369	6	
		164	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
J. H. Dowling, Glossop, River Murray	370	31	
	371	68	
	372	39	
		138	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	94	
	374	106	
	375	102	
		302	
Mrs. M. Specht, Holder Avenue, Richmond	376	115	
	377	95	
	378	106	
		316	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	68	
	380	100	
	381	32	
		200	
G. Frisby Smith, Fulham House, Fulham	382	105	
	383	33	
	384	57	
		195	
B. Cooke, Kanmantoo	385	124	
	386	11	
	387	125	
		360	
Willow Bend Stud Poultry Farm, North Walkerville	480	130	
	481	101	
	482	112	343
	483	69	
	484	110	
	485	98	277
			620
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	141	
	459	103	
	460	146	
		390	

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Total Class No. 3.		5,916	

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	86	
	389	110	
	390	64	260
	391	103	
	392	112	
	393	104	319
			579
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	79	
	395	118	
	396	126	323
	397	118	
	398	52	
	399	105	275
			598
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400	59	
	401	74	
	402	118	
		251	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	58	
	404	92	
	405	101	
		251	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	58	
	407	125	
	408	117	
		300	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	85	
	410	59	
	411	60	
		204	
K. Pennack, Pooraka (Barnevelders.)	412	113	
	413	78	
	414	116	
		307	
G. W. Lindsay, Torrens Road Kilkenny (Langshans.)	461	36	
	462	47	
	463	94	
		177	
Total Class No. 4.		2,667	

Class No. 5—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
A. O. Dawkins, Gawler	415	86	
	416	81	
	417	56	223
	418	94	
	419	119	
	420	107	320
			543
A. V. Dupen, Melton Street, Glenelg	421	56	
	422	dead	
	423	117	
		173	
A. J. Monkhouse, Woodside	424	118	
	425	100	
	426	104	
		322	
Total Class No. 5.		1,038	

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.	
A. C. Byrne, 114, Rose Terrace, Wayville West	427	56	
	428	60	
	429	68	184
	430	83	
	431	98	
	432	97	278
			462
G. Frisby Smith, Fulham House, Fulham	433	112	
	434	92	
	435	120	
		324	
Total Class No. 7.		786	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Oct. 13th, 1934.
Home Project Utility Section.—Wet Mash.		
John Plummer, Virginia School	436	85
Dudley Harper, Murray Bridge School	437	81
Jack Beauchamp, Murray Bridge School	438	59
Jack Beauchamp, Murray Bridge School	439	71
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	120
Stanley Pratt, Abattoirs School	442	103
Mervyn Steer, Sturt School	443	101
Donald Welford, Westbourne Park School	444	87
E. Zbierski, Gawler School	445	106
J. McInerney, Gawler School	446	64
F. Martin, Gawler School	447	112
Darcy Coleman, Mallala School	448	84
Kevin Angus, Mallala School	449	57
Alwin Scott, Wellington Road School	450	98
Jack Dietman, Wellington Road School	451	105
Milton Smith, Salisbury School	452	135
Owen Robinson, Ascot Park School	453	66
Paul Mundy, Urrbrae High School	454	80
Max Couche, Thebarton School	455	119
Robert Swift, Murray Bridge School	456	127
Bruce Dooland, Thebarton Central School	457	23
Ian Slee, Two Wells School	470	70
Total		1,953

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at the Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED OCTOBER 13th, 1934.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	145	39
B. R. Whittington	136	141
J. O. Marshall	133	86
Trios—		
B. Cooke	374	319–321
W. R. Williams	342	262–264
A. & H. Gurr	340	181-183
Teams—		
A. & H. Gurr	623	193–198
T. Duhring	620	181–186
Gallagher & Aslin	596	307–309 and 464–466

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	113	332
Langmaid & Bettison (Minorca)	102	473
A. Heaysman (Cuckoo Leghorn)	95	333
Trios—		
A. Heaysman (Cuckoo Leghorns)	265	331–333
V. F. Gameau (Minorcas)	215	328–330
Langmaid & Bettison (Minorcas)	209	471–473

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	149	339
F. F. Welford	146	460
F. F. Welford	141	458
Trios—		
F. F. Welford	390	458–460
H. J. Mills	375	337–339
B. Cooke	360	385–387
Teams—		
F. F. Welford	692	373–375 and 458–460
H. J. Mills	687	334–339
Willow Bend Stud Poultry Farm	620	480–485

Class 4.—Any other Heavy Breeds.

All Rhode Island Reds.

Singles—		
A. G. Dawes	126	396
Woodbury Poultry Farm	125	407
E. F. Snow	118	402
A. G. Dawes	118	397
A. G. Dawes	118	395
Trios—		
A. G. Dawes	323	394–396
A. G. Dawes	319	391–393
K. Pennack (Barnevelders)	307	412–414
Teams—		
A. G. Dawes	598	394–399
A. G. Dawes	579	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—		
A. O. Dawkins	119	419
A. J. Monkhouse	118	424
A. V. Dupen	117	423
Trios—		
A. J. Monkhouse	322	424–426
A. O. Dawkins	320	418–420
Teams—		
A. O. Dawkins	543	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	120	435
G. Frisby Smith	112	433
A. C. Byrne	98	431
Trios—		
G. Frisby Smith	324	433–435
Teams—		
A. C. Byrne	462	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Milton Smith, Salisbury (White Leghorn) ..	135	452
Robert Swift, Murray Bridge (Black Orpington)	127	456
Eric Pratt, Abattoirs (White Leghorn) . ..	120	441
Max Couche, Thebarton (Rhode Island Red)	119	455
F. Martin, Gawler (White Leghorn)	112	447

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to August 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to Aug. 30th, 1934.	No. Eggs Laid Month of Sept. 1934.	Total Eggs Laid April 1st, 1933, to Sept. 30th, 1934.
No. 1 test	9,705	850	10,555
No. 2 test	8,914	795	9,709
No. 3 test	8,617	848	9,465
No. 4 test	9,965	788	10,753
No. 5 test	4,801	573	5,374

THE RED-LEGGED EARTH MITE *HALOTYDEUS DESTRUCTOR* (Tucker) IN SOUTH AUSTRALIA: WITH REMARKS UPON *PENTHALEUS MAJOR* (Dugès).

[By D. C. SWAN, B.Sc., Waite Agricultural Research Institute, University of Adelaide.]

A.—HALOTYDEUS DESTRUCTOR.

I.—INTRODUCTION.

Halotydeus destructor has been known as a pest of market crops in South Africa since 1908, and in Western Australia since 1917. During the past few seasons it has reached pest proportions in certain parts of South Australia. Preliminary studies to determine the economic status of the mite in this State were therefore begun at the Waite Institute in the winter of 1933. These were continued during the past (1934) winter, and certain of the observations made are now recorded. The literature contains comparatively little on the biology of the mite, and these inquiries have so far been chiefly directed towards supplementing this side of the problem.

II.—DISTRIBUTION.

The mite was first reported by Jack (1908) in the Cape Province of South Africa; his account was well illustrated, and gave the main features of its biology. It was first investigated in Australia in 1917 (*vide* Newman, 1925, *b*); it was considered by Johnson (1930) to have been introduced into South Western Australia in ship-ballast dumped at Bunbury. A few years later it had spread to most of the south-western part of that State.

A series of reports on the mite by Newman (1920-23 *et seq.*) in Western Australia dealt largely with the economic aspect. Froggatt (1921, p. 34) mentioned that a mite which attacked potatoes, peas, &c., was known in Victoria; it is thus probable that *Halotydeus* was present there then. French (1925) refers to the "pea mite"; doubtless this species is meant. It is not known when the red-legged earth mite first appeared in South Australia; Johnson (1930) was the first to record it, but it is known to have occurred in large numbers at Naracoorte in 1925. It was recorded (Anon., 1930) from Corowa (on the Murray R.) and Henty, in New South Wales. Womersley (1933) recorded it from Victoria, Tasmania, New South Wales, and the Federal Capital Territory. It has thus established itself widely in Australia, though in most places its damage is confined to local areas.

In South Australia it is widely distributed, but is most troublesome on the Adelaide Plains, and in some parts of the South-East. It has been taken at Noarlunga, Lockleys, Gepp's Cross, Mount Barker, Kersbrook, Bordertown, and Naracoorte among other places. Johnson (*loc. cit.*) lists further localities. Generally speaking, it is distributed irregularly through most of the better rainfall areas of the State (*i.e.*, those lying within the 15in. isohyet).

III.—SYSTEMATICS.

The identity of the Red-legged Earth Mite in Australia has been associated with considerable confusion. Jack (1908), in dealing with the mite in the Cape Province of South Africa, did not name the species, but placed it in the family Eupodidae. In 1925, Tucker, also in South Africa, described it as *Penthaleus destructor* n.sp., utilising a manuscript name of Jack's for its specific name. In 1921, however, Froggatt had described a closely similar mite from New South

Wales as *Notophallus bicolor.* The Red-legged Earth Mite of Western Australia was for some years determined as this latter species. Newman (1925, *b*) accepted Tucker's name for the West Australian pest, and distinguished it from Froggatt's eastern Australian species. In 1929 a note in the Journal Commonwealth C.S.I.R. (Anon., 1) stated that the correct name of the mite according to Womersley was *Halotydeus destructor* (Tucker)* and that *Notophallus bicolor* belonged in the genus *Penthaleus*, and now became *Penthaleus bicolor* (Froggatt). Re-descriptions and synonymies of these mites were given by Womersley (1933). Further remarks on the nomenclature of *P. bicolor* will be made in a later section; it is pointed out that this species should now be known as *P. major* (Dugès). Finally, the genera *Penthaleus* and *Halotydeus* have been separated from the Eupodidae; they were placed by Oudemans in 1931 in a new family Penthaleidae.

The main steps in the synonymy of *H. destructor* may therefore be given as follows:—

Family: PENTHALEIDAE Oudemans 1931.
Genus: HALOTYDEUS Berlese 1903.
Syn. *Penthaleus* Koch 1838 (in part).
Notophallus bicolor Froggatt (of Newman, 1923, 1924).
Penthaleus destructor Tucker 1925.
P. destructor (Jack) (Newman 1925).
P. destructor Jack (Anon., C.S.I.R. Journ. II., 1929).
P. destructor Jack (Johnson 1930).
Halodytaeus (sic) *destructor* Tucker (Anon., C.S.I.R. Journ. III., 1930).
Halotydaeus (*Penthaleus*) *destructor* (Anon., Ag. Gaz. N.S.W., XLI., 1930).
H. destructor Tucker (Davidson 1932).
H. destructor Tucker (Waite Inst. Rept. 1933, p. 58).
Halotydeus destructor (Jack) 1908 (Womersley 1933).
Halotydeus destructor (Tucker) 1925.

IV.—LIFE HISTORY.

In general the life history of a mite is as follows: eggs are laid which hatch to give individuals resembling the adult, but which possess only three pairs of legs. This stage is known as a *larva;* after the first moult the mite has four pairs of legs and the facies of the adult, but is sexually undeveloped, and lacks the genital orifice; it is then known as a *nymph.* One or more nymphal stages, each separated by a moult, intervene between larva and adult. Final stage nymphs develop into adult males or females.

In the case of *Halotydeus destructor* this general plan is followed. The egg (Fig. 1, a) is bright yellow or orange in colour. It is covered by a tough though flexible chorion (outer coat) which is lined with a delicate inner membrane. The surface of the egg is smooth and shining when moist, but when dry may have a whitish bloom; this is due to the drying of a secretion (? of the oviducts) which sticks the egg to the surface on which it is laid.

Several methods of handling the eggs were tried. The most useful of these was to place them on a piece of filter paper resting on a layer of damp sand in a petri dish. They were kept at constant temperature in biological incubators of various types. Adequate moisture is essential for hatching. Eggs placed on dry filter paper in a sealed vessel over water (e.g. in a desiccator) show no sign of development even in this practically saturated atmosphere. For development to begin, the material on which the eggs are resting must be wetted.

*Inaccuracies that have crept into the literature in regard to the name of this mite are:—(1) The attributing of the authorship of *H. destructor* to Jack instead of Tucker, and (2) the spelling of *Halotydeus* as "*Halotydaeus.*"

The process of hatching is briefly as follows: Water is first absorbed through the chorion, and the egg swells slightly, much as a germinating seed. A longitudinal split occurs along one side of the chorion, which is at first closed by the tightly stretched inner membrane (Fig. 1, b). The latter is ruptured mainly by internal pressure but it is aided by two prominences of the embryonic cuticle, which function as "egg-bursters." These occur in the cephalothoracic region. The embryo, with the rudiments of the appendages already well developed, then protrudes from the chorion (Fig. 1, c); it gradually assumes a dull reddish to purple tinge, and the appendages segment. Finally the fully developed larva waves its legs hesitatingly for a short period, and then steps out of the chorion and runs actively away, testing the surface of the paper at frequent intervals with its mouth parts. The body is more elongated than in the adult mite, and very distinct segmentation is visible, particularly at the posterior end of the abdomen (Fig. 1, e).

A point to be stressed in connection with the development of the egg is its intimate relation with the water supply. Unless the egg remains throughout its incubation in contact with adequate moisture, hatching does not occur. Conversely, excessive wetness under certain circumstances may be unfavourable

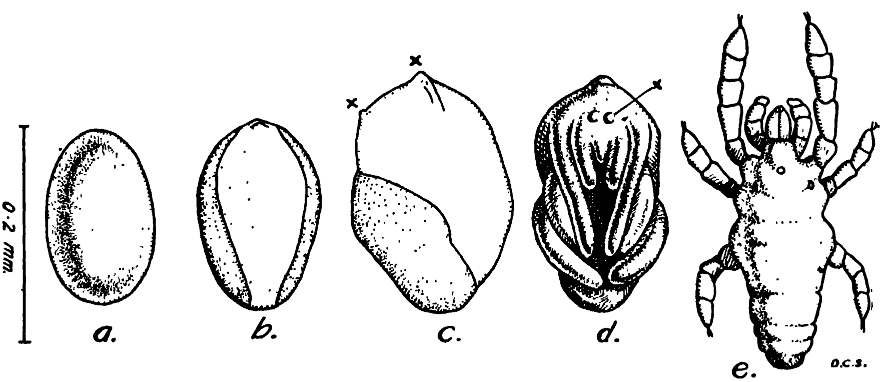


Fig. 1. *H. destructor.* **Development of the egg. (*a*) Egg as laid. (*b*) Chorion split; inner membrane still intact. (*c*) Embryo freed from membranes; egg bursters at X. (*d*) Later stage showing appendages: rudiments of chelicerae (between palps), palps, and three pairs of legs are visible. Egg burster at X. (*e*) Newly emerged larva.**

for development. This appears to be most important where the eggs are exposed to fluctuating temperatures (as in nature). Eggs so affected often swell greatly after the chorion splits; they become globular, due to distention of the inner membrane, and then burst. Many hatching tests failed from this cause. This susceptibility to excess moisture may account for the virtual restriction of the mite in nature to light (sandy or loamy) soils. On heavy soils (e.g. clays) it does not thrive, though it may be present and lay eggs abundantly. Possibly the limiting factor may be the heavy mortality of the eggs resulting from the unsuitable moisture conditions obtaining at the soil surface; these depend upon the physical properties of the soil.

Temperature and Development.—The egg has a short incubation period compared with most insects. The following hatching times were obtained by maintaining eggs at constant temperatures in incubators under moisture conditions kept as favourable as possible. The eggs were laid usually within twelve hours of the start of each test, and many hundreds were used.

Temperature.	Incubation Period. Days.
10° C. (50° F.)	8½
14° C. (57° F.)	6½
17° C. (63° F.)	5
20° C. (68° F.)	4
24° C. (75° F.)	2½

Hatching thus proceeds rapidly at temperatures which greatly slow up the process in *Smynthurus viridis* (the lucerne flea), which is another common pest found with the mite. At 15° C. (59° F.) the eggs of *Smynthurus* take 16 days (*vide* Davidson, 1931). These values indicate that *Halotydeus* thrives at temperatures below the optimum for the lucerne flea. Jack and Tucker (*l.c.*) give the hatching time as 8 days (no temperature specified), but it is probable that retardation occurred, due to inadequate moisture supply to the eggs.

The newly hatched *larva* (Fig. 1, *e*) is 0.25 mm. (1/100th inch) long, and is hardly visible to the unaided eye. It does not assume the black body colour of the adult for several days. It appears to survive best in damp, but well-ventilated situations. For this reason larvae were difficult to maintain in the laboratory; efforts to rear them to the adult stage have not yet been successful. Information on the number of nymphal stages, and the time taken by an individual to reach maturity, is scanty. Tucker (1925) stated that four or five nymphal stages precede the adult. Jack (1908) found that these occurred at intervals of five days; maturity was reached 24 days after hatching. Tucker found that 20 or more days must elapse after hatching before eggs are laid. These periods take no account of temperature.

THE ADULT.—The adult (Fig. 2) has a velvety black body and red legs. The integument is thrown into very fine wrinkles or striae, of which the distance from ridge to ridge is of the order of 1.2μ (Fig. 3, *f*). A double row of feathered setea runs down the dorsal surface near the mid-line. The ventral surface carries more setae, and the legs are well supplied also; all the setae are plumose. The first pair of legs is the longest; as noted by other authors, they are used as tactile organs, as well as for locomotion. The second pair is the shortest. The legs terminate in paired claws, and a median pad (pulvillus) (Fig. 3, *d*). Two ocelli are present; they are situated on the antero-lateral margins of the body. The anus is terminal; the genital aperture is ventral. The latter is large, and flanked by two suckers and numerous setae on each side; it has been described by Tucker (1925). The mouthparts (Fig. 3, *b*) are placed sub-terminally. Five-jointed palps lie at each side of the piercing structures, which consist of paired mandibles (chelicerae) above, and below, a conical structure, the hypostome. The chelicerae are short and powerful, while the hypostome is also strongly muscular. The latter terminates in a number of chitinous papillae, and is bifurcated at the tip.

OVERSUMMERING.

H. destructor is present in the field from the onset of the regular winter rains until the early summer, when it succumbs to higher temperatures and desiccation. In 1933, by the end of October, it could be found with difficulty, and only in sheltered situations. The summer drought is bridged by the egg, as has been shown by Tucker (*l.c.*). This author also found that the dried bodies of mites contained eggs which hatched in the following winter.

The eggs lose water rapidly when exposed to the air, and become deeply concave along one side. When placed on a wet surface, water is taken up by the egg, and in a few hours it resumes its original shape. The writer has had no success in hatching eggs saved from the preceding season. They were kept dry in petri dishes in the laboratory, for periods from six to twelve months. Such eggs often

became bleached, losing most of their orange colour; they burst readily when wetted. It is evident, however, that certain eggs in sheltered situations in the soil or beneath vegetation remain viable through the summer.

Tucker was able to obtain young mites by moistening soil taken from the field in the summer, from places where the mite had been present. The annual plants upon which the eggs are laid die, like the mite, at the approach of summer. The subsequent disintegration of these plants permits this scattering of the eggs, and many must come to rest in suitably sheltered situations.

V.—HABITS IN THE FIELD.

OVIPOSITION.

The eggs are laid almost entirely on the under sides of the food plant, and mostly where these come in contact with, or are close to, the soil surface. Plants having the rosette habit are therefore favoured. In rare cases, where a plant is growing in the midst of a dense crop, the upper leaves may carry some eggs. This has been seen on the leaves of Cape weed (*Cryptostemma calendulaceum*) growing in a crop of peas.

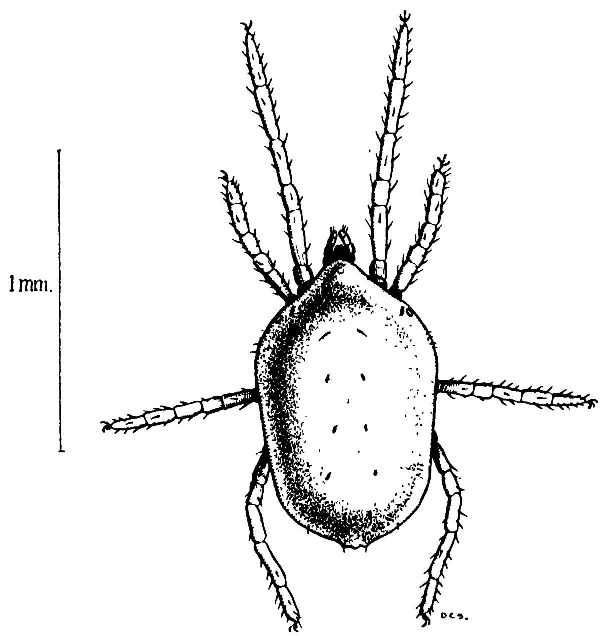


Fig. 2. *Halotydeus destructor.* **Adult female.**

The eggs are laid at random, in a single layer. No webbing is spun over them. They may be so abundant as to cause the under side of a leaf to appear orange in colour. It is not known how many eggs are laid by a single female in her lifetime. The following are counts of the eggs found by dissection in the bodies of a number of mites; 19, 38, 55, 1, 20, 38, 61, 41.

Egg-laying in the field only occurs in suitably damp situations. The process of oviposition has not been observed; the sites chosen preclude this. The mites will not oviposit on a dry surface. Tucker (1925) says that as summer approaches oviposition increases. In the laboratory I have found this to be greatest during the coolest winter months (June-August). As soon as the daily maximum temperature in the laboratory reaches 18°-20° C., egg-laying activity

decreases. Unless the filter paper provided for oviposition was kept moist, no eggs were laid upon it. If the egg-laying surface such as a filter paper or leaf was reversed after oviposition had begun, the mites then laid on the surface newly placed downward. The mites lay both by day and by night, but most eggs are laid in daytime.

In captivity, in uncongenial conditions, the mites may spin fine webbing from point to point over irregularities of the surfaces of their container, and also on the leaves on which they are feeding. In a glass vessel, they often spin patches of smooth white web on its walls, which may in some cases be extended from side to side as loose sheets.

FEEDING HABITS.

When the conditions are suitable, the mites feed at any time, day or night. In bright sunlight they feed on the lower leaves and petioles; in dull light they may ascend to the higher leaves. Their feeding movements are largely determined by the saturation deficit of the atmosphere: the higher this is, the more their range is restricted to sheltered situations. A dense crop of silver beet (*Beta vulgaris* var.) was examined at night. It was heavily infested by *H. destructor,* which was feeding to the tops of the highest leaves, and all parts of the plants were dotted with mites. Under most conditions *H. destructor* is negatively phototropic. This response usually does not deter the mites from feeding in bright light.

The mites are gregarious when feeding—a thick cluster will attack a particular spot on a leaf, gradually enlarging the area of damage, neglecting other parts of the same leaf, or nearby leaves. They prefer broken edges, or injured parts of leaves, to making an entry through intact epidermis.

When undisturbed the mites remain quiescent, feeding in patches on the plant. At the slightest artificial disturbance they move rapidly in all directions, or, more usually, release their hold immediately, and fall to the ground. They are restlessly active when not feeding, and have a characteristic way of running which readily distinguishes them from Tetranychid mites. They congregate on the ground when not feeding, in small hollows on the surface, or beneath leaves resting upon it.

The feeding process is suctorial in nature, but is not comparable with that found in the insect order Hemiptera (bugs, aphides, &c.). When feeding, a mite braces the legs firmly, and applies its mouthparts to the leaf surface. The palps press lightly on the surface, and the hypostomal region is applied firmly. The chelicerae (Fig. 3, *b*) which retain the primitive chelate condition, lie close against the upper surface of the hypostome, and slide alternately back and forth; the sharp and blade-like moveable digit of each pierces the leaf epidermis and reaches the palisade layer. The turgidity of the ruptured cells causes the contents to well out; the tip of the hypostome is applied at this point, and the droplet of plant juices drawn up.

Feeding results in the extraction of the contents of the cells, and marks the leaf in a characteristic fashion. Affected areas of the leaf have a silvery appearance (Fig. 4, *a*) which can be distinguished from the damage produced by the Tetranychid mites, or from that of *Smynthurus viridis,* which is often associated with *Halotydeus.* A leaf damaged by the mite remains opaque when held to the light; the feeding of *Smynthurus* shows as transparent patches. The silvered areas extend as the mites continue feeding; according to the extent to which the contents of the palisade cells have been removed, the leaf assumes a bleached appearance (Fig. 4, *b*). In nature, such leaves rapidly wilt and shrivel, and heavily infested plants may appear as though scorched.

Serial sections of normal and "silvered" leaf tissue of *Sonchus oleraceus* were examined; they showed that the epidermis of the injured leaf was collapsed. The cuticle showed fine breaks at intervals. The cells of the palisade parenchyma layer were largely emptied of their contents, including the chloroplasts. The silvery appearance is due to the replacement by air of the contents of these cells. The epidermis still overlies them closely, and the condition found in the fungus disease "silver-leaf" of plum trees, in which air exists between epidermis and palisade layer, does not obtain (cf. Tetley, 1932).

VI.—ECONOMICS.

H. destructor is chiefly a feeder on annual plants. From observations made in South Australia, it appears to have a strong preference for broad-leaved (Dicotyledonous) plants. Monocotyledons (including grasses) are much less readily attacked.

The food plants may be considered as weeds, pastures, and market crops. Some of the common weeds around Adelaide are preferred food plants. Chief of these is the Cape weed (*Cryptostemma calendulaceum* R. Br.). Others fed on, in order of preference, are:

Sonchus oleraceus L. (Milk-thistle).
Stellaria media L. (Chickweed).
Echium plantagineum L. (Salvation Jane).
Urtica spp. (Nettles).

The following plants appear not to be attacked:

Rumex spp. (Docks).
Emex australis Steinh. (Three-corned Jack).
Malva parviflora L. (Mallow).
Chenopodium spp. (Fat Hen).
Oxalis cernua Thunb. (Soursobs, Sourgrass).

H. destructor has not come under notice in this State as a pest of pastures. In Western Australia it is regarded as being perhaps the chief enemy of the permanent pastures of the South-West of that State (*vide* Section VII.). Permanent pastures in the winter rainfall belt of Australia have been developed by the use of artificial fertilisers; the areas are seeded, chiefly with clovers (e.g. *T. subterraneum*) which are readily attacked by the mite. In an experimental area of permanent pasture at the Waite Institute, consisting chiefly of *Phalaris tuberosa* and *T. subterraneum*, the latter showed during the past spring distinct evidence of injury. The mites feed in clusters on the leaves, which exhibit mottled whitish markings. Experimental injury to *T. subterraneum* is shown in Fig. 5. In this pasture the damage observed in the past two seasons, cannot, except in very local areas, be regarded as serious. It must be pointed out that the soil at the Waite Institute (red brown earth) is heavy compared with much of the podsolised soils of South Western Australia. In the South-East of South Australia, where the mite occurs in market crops, it has not been reported as damaging the extensive areas of clover pastures there; a brief visit to the region in the winter of 1933 did not supply evidence of damage in these pastures.

It has been reported (Anon., 1930) to attack wheat in New South Wales. It has been seen feeding on young wheat at the Waite Institute (October, 1934) but appears to be confined to the edge of the crop adjacent to a headland supporting weeds.

Market crops in South Australia have for the past few years been attacked in certain areas. Tomatoes are grown extensively under glass on the sandy or alluvial soils of the Adelaide Plains. Well established plants are often attacked, but the chief injury is done to seedling transplants. A new transplant takes

several days to establish a root system; mites migrate into the houses from the weeds outside, and during the nights following planting, their numbers may be sufficient completely to wilt the seedlings. A plant reduced to this state rarely recovers. Sometimes all plants in a glasshouse may be destroyed. Other Solanaceae attacked are potato and tobacco. The former has suffered much damage in local areas in the above region, while damage to tobacco is reported in Western Australia (Newman, 1931). Pittman (1930) considers that *H. destructor* may assist to distribute the spores of "downy mildew" of tobacco.

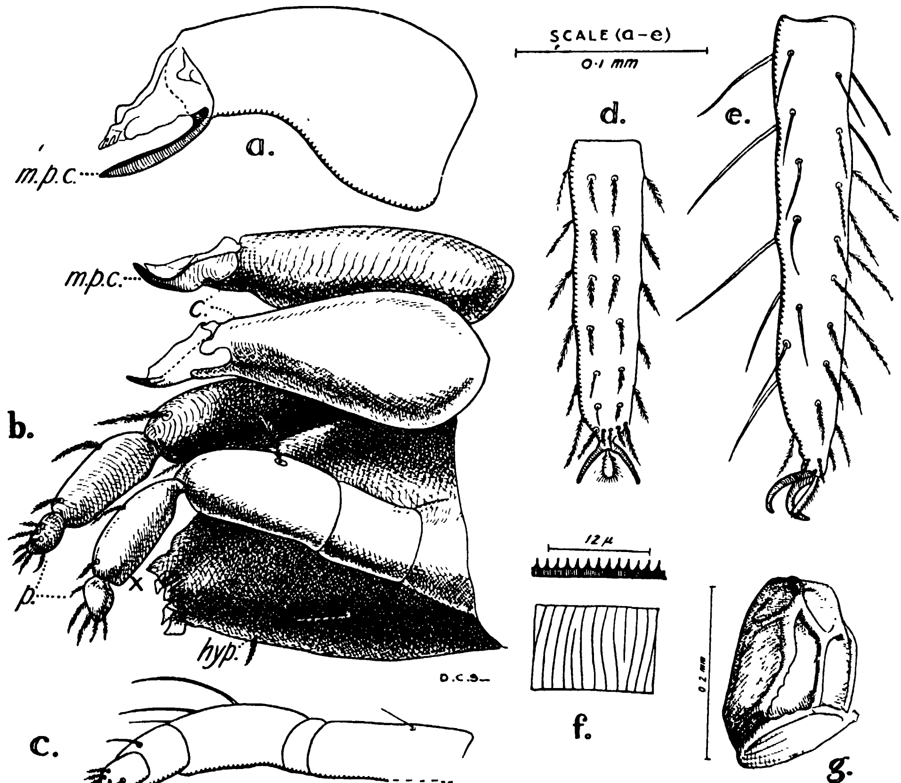


Fig. 3. a. Chelicera of *P. major*. Note bayonet-like moveable process (*m.p.c.*). The fixed process is lightly chitinised. b. Lateral view of the mouthparts of *H. destructor*. The tips of the chelicerae (*C*) normally occupy the position X. The moveable process of the Chelicera (*m.p.c.*) is blade-like; *p*, palps, and *hyp.*, hypostome. c. *P. major*: Palp. from above. d. *H. destructor*. Fore-tarsus. e. *P. major*. Fore-tarsus. f. Cross section and surface view of integument of *H. destructor*. g. Egg of *P. major*. The basal cap is formed from the secretion which holds it to the leaf, and is variable in form.

Legumes (Papilionaceae) include many favoured food plants. Garden and field peas (*Pisum sativum*) and sweat peas (*Lathyrus odoratus*) are specially liable to attack. Mites may do so much damage to the primary shoot of such plants when it shows above ground, that it may not be sufficiently vigorous to grow away. An area of six acres of peas was inspected in August 1933 near Adelaide (Gepp's Cross). It was in the midst of a weedy paddock in which the mite was common. The plants remained short and stunted, about one inch high. A small protected area planted at the same time stood nearly twelve inches high. At Bordertown a crop of 70 acres of field peas was inspected in September 1933. These were fully grown, but the mites were feeding all over the plants

(in dull weather) including the flowers and young pods. The pods failed in many cases to develop, greatly reducing the yield of seed for which the crop was grown. Usually vigorous plants of most species can withstand the mites, and still produce a crop. It is when they are heavily attacked at an early growth stage that the effect is most serious.

Other market crops severely affected are lettuce (*Lactuca sativa* L.), beet (*Beta vulgaris* L.) also its variety, silver beet, and to a lesser extent most other broad-leaved market crops. Silver beet is in the writer's experience probably the most favoured local food plant of the mite. It tends to desert other plants in the vicinity and congregate where this is growing. Silver beet is very little cultivated in South Australia. Ornamental annuals attacked include *Viola* spp., and *Ranunculus*. Many other plants have been listed by Jack, Tucker and Newman.

Thus at present the problem in South Australia appears to be confined largely to market crops and to ornamental plants. The position in regard to pastures as it occurs in Western Australia, appears not to have developed.

VII.—CONTROL.

Given an adequate food supply, the numbers of *H. destructor* respond in the usual fashion, to the influence of weather. In the case of this species temperature is a limiting factor in the spring and summer; in the period of optimum temperatures (late autumn to spring) rainfall may affect the population. Thus during the winter of 1933, the mite was very troublesome on the Adelaide Plains; the rainfall was rather above the average. During the past (1934) winter, mites were little in evidence until the beginning of August, owing to the exceptionally late onset of the winter rains. In 1933, tomatoes in glasshouses in this region were much attacked; in 1934 no damage was done.

No natural enemy of the mite is known; various fellow inhabitants of the soil surface doubtless take some toll, but none appears to be worth mention.

All previous writers have stressed the value of clean cultivation in keeping down the numbers of *H. destructor*. Most of its breeding takes places among weeds; an open-growing market crop provides little shelter for the eggs. The mites move back and forth between weeds and crop. This is specially so with glasshouses, in which breeding conditions are usually unsuitable. Weed-control as far back as possible from cultivated crops is therefore an essential beginning to control of the mite. Weed-killers such as sodium chlorate might be used with advantage in this connection.

Control measures are most practicable in small areas, such as market and home gardens. Probably the most efficient time to spray or dust is about a fortnight after the winter rains have set in; the newly hatched young from the oversummering eggs will be attacked before they reach maturity.

It has been indicated that the mites do most damage to young plants. Where control measures are undertaken these should be directed towards checking the mite at this period, to enable the plants to establish themselves; the latter are then more fitted to withstand later attacks. Successful establishment of young tomato plants in glasshouses in the face of heavy mite attack was obtained by one grower by spraying with nicotine sulphate. The treatment was repeated at intervals of three days.

Tobacco wash was found by Jack (1908) to be a satisfactory spray. Tucker (1925) also found tobacco extract (1 in 80) to be effective. Newman (1923) gives the following formula:—

Tobacco waste	1lb.
Water	2 galls.
Washing soap	¼lb.

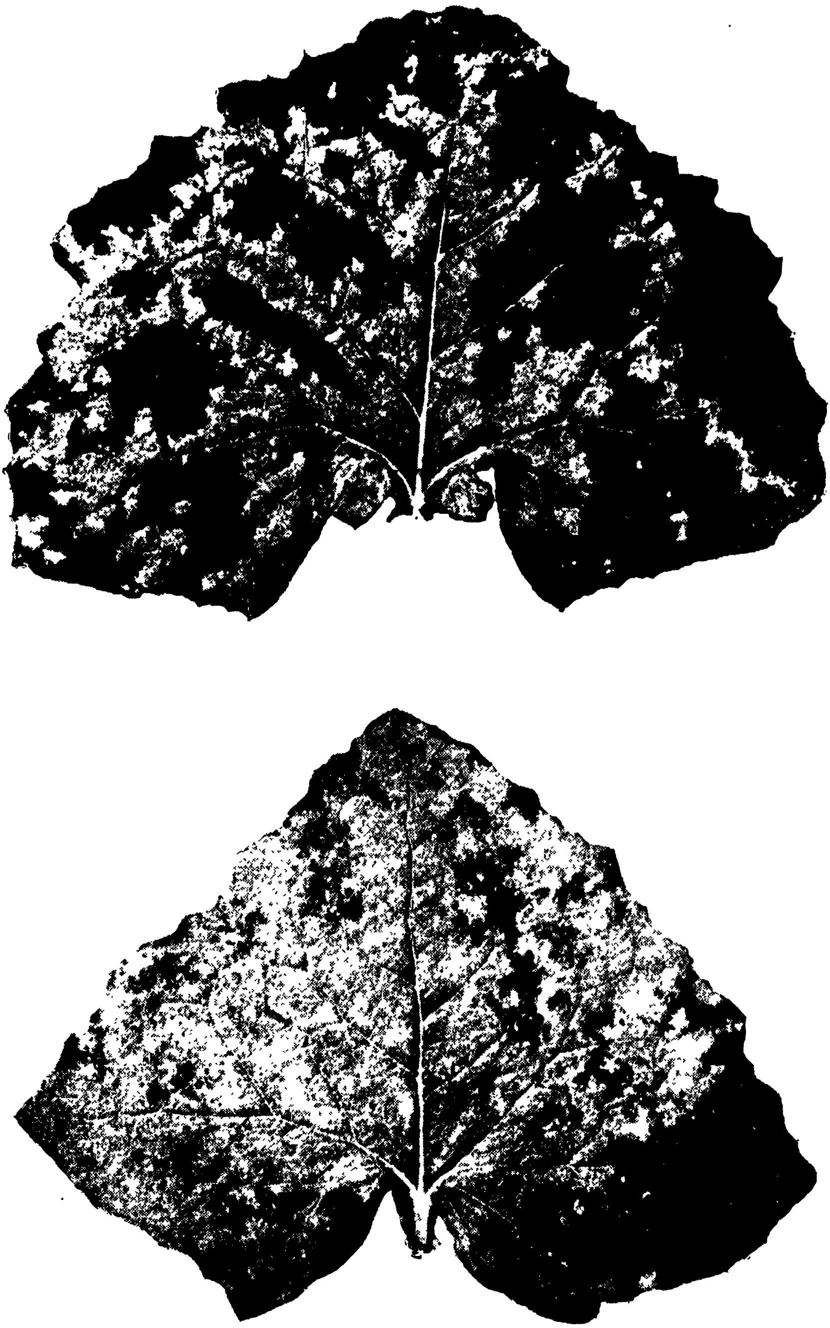


Fig. 4. **Injury to leaves of *Sonchus oleraceus* caused by *H. destructor* (produced by exposing leaf to large numbers of mites in laboratory). *Above*: Early stage. *Below*: After two days' feeding. The epidermis is not visibly broken, and the leaves are still opaque when held to the light.**

The advantage of nicotine and nicotine sulphate sprays is that they do not injure the plant. The killing power of such sprays falls rapidly after application. To obtain full effectiveness, the addition of soap is essential.

Lime-sulphur is well known as an efficient killer of many mites. Ward (1932) stated that control was obtained in Tasmania of *Penthaleus bicolor* (= ? *H. destructor*) when lime-sulphur was used at the strength 1 : 100. We have used lime-sulphur 1:50 in laboratory tests against *H. destructor* and *P. major;* it kills all mites that are wetted, though its action is rather slow. The full efficiency of this spray is not obtained unless a wetting agent is added; *H. destructor* is difficult to wet owing to its fine wrinkled integument (cf. Fig. 3, *f*). Various forms of wetters or spreaders are on the market; soap is not suitable with lime-sulphur.

A pyrethrum extract spray that was tested in the laboratory killed a large proportion of the mites, but appeared to be less effective than lime-sulphur spray, or pyrethrum applied as a dust.

In dense growing crops it is necessary that sprays be carefully directed, in order to reach all parts of the plants. In such cases dusts are often more serviceable; they must be applied when the plants are dry. Nicotine dusts kill mites that are hit, but their action is short, and mites are soon feeding again on the dusted leaves. Pyrethrum dusts have been tested, and kill quickly; the dust used had been diluted 1 : 5 with sulphur. Derris dust also killed well, but did not seem quite so effective as pyrethrum, though its killing power probably lasts longer.

Newman (1925, *b*) recommended a dust made of carbolic powder (4 per cent.) mixed in a carrier such as lime. He also recommended a kerosene emulsion.

Protection of growing plants from infestation by various means has been reported. Tucker employed boards standing on edge and painted with tanglefoot. This kept all mites out, but its lasting quality varies with the degree of exposure, and the amount of dust blown about. Its formula is:—

Resin . . . . 8 parts by weight
Crude castor oil . . . . 5 " " "
A few drops linseed oil (to keep thin).

Warm and stir; do not let boil; apply hot. The residue is re-heated for further applications.

In the case of glasshouses, mites may be kept out by the use of suitable repellents. It is desirable to have a complete wooden border along the base of the walls of the houses. These may be painted with repellent substances (e.g. creosote).

Field tests with any of the foregoing materials have not yet been undertaken in connection with these studies. The preceding survey indicates, however, the methods of treatment that have been recommended. Those that are worthy of further investigation are lime-sulphur sprays and pyrethrum and derris dusts. As the feeding process of *Halotydeus* is suctorial in nature, contact poisons are called for; the possible value of any stomach poison appears not to have been studied.

IN PASTURES.—Newman (1925, *et. seq.*), Gardner and Dunne (1933), and Davies (1933) have indicated the serious nature of the injury done to pasture in Western Australia by *H. destructor*. In pastures control measures present the difficulties found wherever widely distributed pests are concerned.

Newman (1925, *b*) recommends carbolic powder mixed with superphosphate, and applied with a superphosphate spreader. He later (1930, *b*) introduced a spray designed to attack *Smynthurus viridis* (the lucerne flea) and the mite simultaneously. The formula is:—

	Galls.
Lime-sulphur concentrate	5
Proprietary cresol spray	1
Water	250

About 60galls. per acre are used.

Davidson (1933) reported the successful use in South Australia of lime-sulphur (1 : 60, 80galls. per acre) against *Smynthurus viridis*. The crop was grazed or mown short before application, and sprayed after the hatching of the over-summering eggs. Field tests of this method against the Red-legged Earth Mite should be of interest.

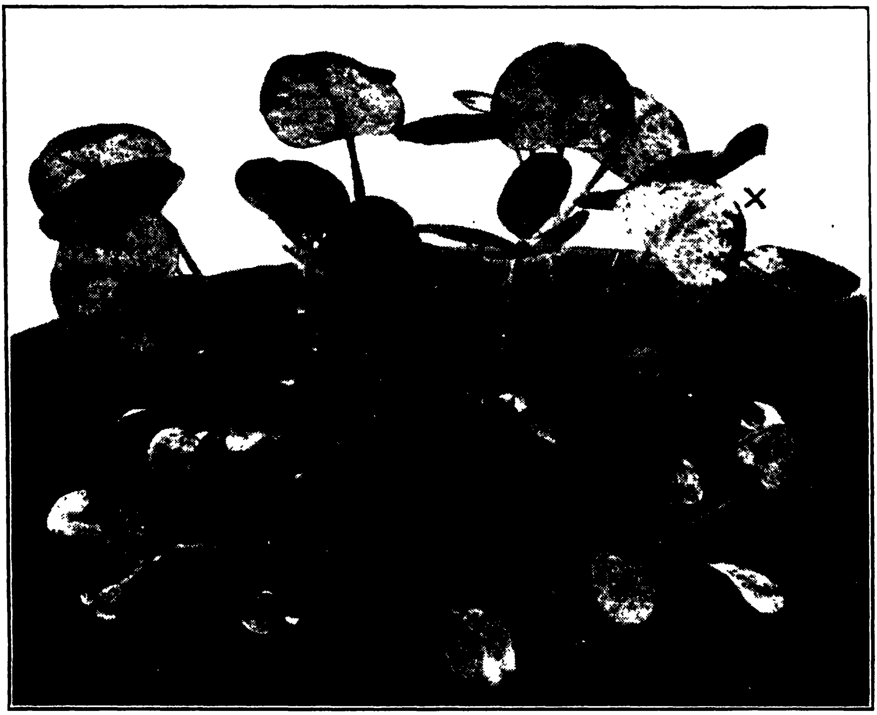


Fig. 5. Injury to Subterranean Clover by *H. destructor*. Note irregularity of damage. A single mite is feeding on leaflet (X).

Gardner and Dunne (1933) recommend burning off an infested pasture in the summer. A creeping fire against the wind is best. This should kill many over-summering eggs, and as the clover burrs are not affected normal germination occurs next autumn. Davies (1933) pointed out that there is evidence in Western Australia indicating that changes in pasture management might be of assistance in reducing damage by the mite. Since perennial grasses suffer much less than clovers, it is desirable to increase the proportion of these in the pasture. The control of Cape Weed in dairy pastures is recommended, as this weed besides favouring the mite, has disadvantages from the pasture and dairy points of view.

A well-kept autumn and early winter fallow should clear an affected area, as in the case of the lucerne flea, since young mites hatching from over-summering eggs are deprived of food.

B.—THE BLUE OAT MITE (PENTHALEUS MAJOR DUGES).

This mite is commonly found in the same situations as *H. destructor*; its habits are very similar, and it is closely related. The following details concerning it are therefore given.

In 1921 Froggatt recorded a mite which was attacking young crops of oats in New South Wales. He described it as a new species, *Notophallus bicolor*, of the family Eupodidae. He did not give details of its biology. The oats were yellowed as a result of its attacks.

Newman originally regarded *H. destructor* in Western Australia as being this species, and reproduced Froggatt's figures in his earliest publication (1923). It was pointed out (Anon., 1930) that *Notophallus bicolor* belongs in the genus *Penthaleus*. Womersley (1933) showed that both *Halotydeus* and *Penthaleus* occur together in Eastern and Western Australia, as well as in South Africa. He also indicated the possibility that *P. bicolor* was synonymous with the European species *P. major* (Dugès). Recently he has been able to confirm this by comparison with specimens of the European form. He has kindly placed this information at my disposal pending its publication elsewhere (Stylops, in press).

The synonymy of *P. major* (modified after Womersley, 1933) may therefore be given as follows:—

Fam.	PENTHALEIDAE Oudemans 1931.
Genus	PENTHALEUS Koch 1838.
Syn.	*Notophallus* Canestrini 1886.
	PENTHALEUS MAJOR (Dugès) 1834.
Syn.	*P. haematopus* (Koch) 1835.
	P. bicolor (Froggatt) 1921.

The characters separating *Penthaleus* from *Halotydeus* were discussed by Womersley (*l.c.*). Briefly they are (1) the anus is dorsal instead of terminal, and (2) the tarsi and terminal segment of the palpi have some plumose setae present; all other setae in *Penthaleus* are simple. In *Halotydeus* all setae are plumose (see Figs. 2, 3, and 6).

The biology of *Penthaleus* has not been studied in detail; it occurs rather sparingly on the Waite Institute estate, and the following observations were made upon it there.

In most situations *Halotydeus* is much the commoner mite; in market crops it may often be obtained exclusively. In cereal crops *Penthaleus* is more commonly met with; the proportions of the two species, if collected, differ according to the nature of the vegetation. The preference of *Halotydeus* for broad-leaved plants has been pointed out; conversely, it would appear that *Penthaleus* favours grasses. Each species will feed on the plants favoured by the other, though much less readily, according to my observations.

The following illustration is taken from a field of mixed *Phalaris tuberosa* and Subterranean Clover at the Waite Institute. The grass grows in dense tufts a foot or more high, and the intervening spaces support the clover. Both mites are present in this pasture. The clover is heavily fed on by *Halotydeus*, while *Penthaleus* is mostly found on the grass, though members of the other species are present in each case. Ten sweeps with a net were made, as far as possible into clover only, and twenty rather larger sweeps into the grass tufts alone. The mites were sorted and counted, as follows:—

	Penthaleus.	*Halotydeus.*
Grass (20 sweeps)	21	21
Clover (10 sweeps)	84	864

Penthaleus major is found in small numbers in dense crops, such as peas, but the writer has not seen damage done to such a crop. Marchal (1908) records it as attacking peas in France, while Malenotti (1925) records it on lettuce in Italy. André (1932), in France, has discussed it in more detail, and has re-figured it.

It was attacking chiefly lettuce. On grasses the mites feed along the leaf blades, favouring the more sheltered leaves in a tussock. They are found singly, the gregarious habit of *Halotydeus* not being manifested. They are less nervous than this species, and do not fall to the ground so readily if disturbed. They move with a more stately measure, lifting the legs high during steps, and do not scurry as does *Halotydeus*. Leaves damaged by their feeding show longitudinal greyish streaks, which turn brown, especially at the tip of the leaf. They do not cause the yellowing characteristic of the feeding of Tetranychid mites; usually in pasture they produce only a slight mottling of the grasses.

Penthaleus major can be distinguished readily from *H. destructor* in the field. The body is purplish-blue, and more rounded than the latter, and has an area of red pigment on the dorsal surface, at the centre of which is the anus. (Fig. 6.) A droplet of clear fluid frequently is found exuding from the anus. The legs are of a deeper red in *Halotydeus*.

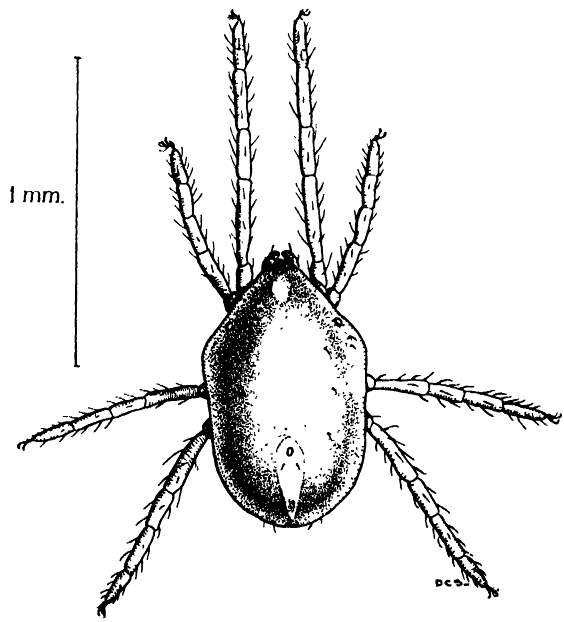


Fig. 6. *Penthaleus major*. **Adult female. Note dorsal anus, in light (red) area at posterior end of body.**

In its biology, so far as it is known, it shows differences from *H. destructor*. The eggs are about half as large again (Fig. 3, *g*), and the outer layer of the chorion is curiously wrinkled. The egg is salmon to whitish-yellow in colour when dry, and deep orange-red when wet. It is laid singly, never in masses, as with *Halotydeus*. *Penthaleus* oviposits mostly under leaves, but it also lays readily on the upper surfaces, and along both sides of upright leaves. It lays few eggs—two to five only were found in the abdomen in microscope preparations. André (1932) gives 3-5 eggs as the number laid. Obviously its power to increase is small compared with *Halotydeus*, assuming the survival rates to be the same.

The hatching of the eggs and life-history generally have not yet been studied. It can be said, however, that as far as it has been observed in South Australia this mite does not appear to be of economic importance. The only exception appears to be its occasional rise to large numbers in young oat crops, as seen in New South Wales. In pastures in the South-East careful searching revealed only isolated individuals.

ACKNOWLEDGMENTS.

The writer is greatly indebted to Dr. J. Davidson for his interest and advice during the course of these inquiries, and to Mr. J. W. Evans, who provided certain of the materials mentioned in Section VIII.

BIBLIOGRAPHY.

ANON. (1929). The Red-legged Earth Mite in Western Australia (*Penthaleus destructor* Jack). J. Coun. Sci. Ind. Res. (Aust.), ii., 244.

——— (1930). Entomological investigations in Western Australia and Tasmania: The Red-legged Earth Mite and the Clover Springtail (Lucerne Flea). *Ibid.*, iii., 189.

——— (1930). The mite *Halotydaeus* (*Penthaleus*) *destructor* attacking wheat. Agric. Gaz. N.S.W., xli., 766.

——— (1934). Report of the Waite Agric. Res. Inst., 1925-32, p. 58.

ANDRÉ, M. (1932). Note sur un acarien (*Penthaleus major* Dugès) nuisible aux plantes potagères. Bull. Mus. Hist. Nat., iv., 284-291.

DAVIES, W. (1933). The grasslands of Australia and some of their problems. Pamplet No. 39, C'wealth Coun. Sci. Ind. Res., p. 35.

DAVIDSON, J. (1931). The influence of temperature on the incubation period of the eggs of *Sminthurus viridis* L. Aust. J. Exp. Biol. Med. Sci., viii., 143.

———(1932). Insects observed on crops in South Australia during the period June, 1930—June, 1932. J. Agric. S. Aust., xxxvi., 284.

———(1933). On the control of the Lucerne Flea in lucerne in South Australia. *Ibid.*, xxxvi., 994-1006.

FRENCH, C. (1925). Vegetable pests. J. Agric. Vict., xxiii., 327.

FROGGATT, W. W. (1921). The Blue Oat Mite (*Notophallus bicolor* n.sp.). Agric. Gaz. N.S.W., xxxii., 33.

GARDNER, C. A., and DUNNE, T. C. (1933). Subterranean clover. J. Agric. W. Aust., x., 47.

JACK, R. W. (1908). The Earth Flea. Agric. J. Cape of Good Hope, xxxii., 614-620.

JOHNSON, W. C. (1930). The occurrence of the Red-legged Earth Mite (*Penthaleus destructor* Jack) in South Australia. J. Agric. S. Aust., xxxiv., 283.

MALENOTTI, E. (1925). Un acaro dannoso all'insalata. Agricoltura veneta, No. 4, separate, 4 pp. Verona (Review in Rev. App. Ent. (A) xiii., 266).

MARCHAL, P. (1908). Sur le *Notophallus haematopus* Koch, etc. Bull. Soc. Entom. Fr., iii., 41. (Quoted by André, 1932).

NEWMAN, L. J. (1920). Ann. Rep. Dept. Agric. W. Aust., p. 40: (1921) *Ibid.*, p. 28: (1923) *Ibid.*, p. 23: (1924) *Ibid.*, 20-24.

———(1923). The Red-legged Velvet Earth Mite. Dept. Agric. W. Aust., Bull. No. 106, 4 pp.

———(1925 a). The Red-legged Earth Mite. J. Dept. Agric. W. Aust., ii., 354. (1925 b). The Red-legged Earth Mite, *Penthaleus destructor* (Jack). Ibid., ii., 469-475.

———(1927). Seasonable hints. *Ibid.*, iv., 78-82.

———(1929). The Red-legged Earth Mite. *Ibid.*, vi., 449-452.

———(1930 a). The Red-legged Earth Mite (*Penthaleus destructor*). *Ibid.*, vii., 115-118.

———(1930 b). Combined spray for the destruction of the Clover Springtail (*Sminthurus viridis*) and the Red-legged Earth Mite (*Penthaleus destructor*). *Ibid.*, vii., 506-507.

———(1931). The principal pests of tobacco. *Ibid.*, viii., 537.

PITTMAN, H. A. (1930). An outbreak of "Downy mildew" (so-called "Blue Mould") of Tobacco in Western Australia. J. Agric. W. Aust., vii., 475.

TETLEY, Ursula (1932). The development and cytology of the leaves of healthy and "silvered" Victoria plum trees. Annals of Botany, xcvi., 631-652.

TUCKER, R. W. E. (1925). The Black Sand Mite: *Penthaleus destructor* n.sp. Union S. Africa Dept. Agric. Ent. Mem. No. 3, 23-26.

———(1925). The Black Sand Mite (*Penthaleus destructor* Tucker). Union S. Africa Dept. Agric. J., x., 269-270.

WOMERSLEY, H. (1933). On some Acarina from Australia and South Africa. Trans. Roy. Soc. S. Aust., lvii., 108-112.

———(in press). On the name of the Blue Oat Mite of Australia. Stylops.

PAPERS READ AT CONFERENCES.

MURRAY LANDS EAST CONFERENCE, KAROONDA, ON July 31st, 1934.

CONCLUSIONS ARRIVED AT FROM 10 YEARS' EXPERIENCE OF MALLEE FARMING.

[By R. Elliot, Kulkawirra.]

While I do not claim to have had as much experience as a wheat grower as some of the other members of this Conference, I have always been observant and during the past 10 years have watched with interest the different phases of crop growth in our district, particularly in relation to wheat growth and disease.

Depth of Ploughing.

The first thing of which I took particular notice was in relation to depth of ploughing. In ploughing a piece of very uneven new land with a 14 disc plough, we found that we were ploughing the banks deeply, and were barely touching the hollows, and when the crop grew, the wheat on the banks was a good crop while in the hollows there was hardly anything, thus pointing to the fact that too shallow ploughing was no good. I have noticed that some of our neighbours who cultivate particularly shallow, seldom have good crops, while those who go in for deeper working usually have much better crops. We have always worked to a fair depth, and have always had fair crops, varying with seasonal conditions.

The first sign of disease which I noticed was in the first wheat crop grown on fallow, and that occurred in small patches in an otherwise healthy crop, which appeared to make very little growth at first, but improved later in the season, and although not so good as the other part of the crop, it ripened rather late, and developed fair grain. These patches appeared at the time to be caused by the surface soil having been blown away in patches. Later in cropping the same paddock, this opinion was confirmed by examining all the weak patches (which were very much larger in the second crop), when the crop was very young, and all these weak patches were on hard ground, from which nearly all the surface soil had blown away. I have noticed the same thing happen in other paddocks, and more particularly in a paddock belonging to a neighbour. This paddock had been well fallowed, worked with a cultivator after a particularly heavy rain during summer, sown in good time, germinated well, and looked well at the start, but soon began to show yellow patches over a large portion of the paddock, particularly on an old track which ran right through the paddock and on which the crop was particularly weak. The state of this crop was brought under the notice of the Department of Agriculture, and two of the officers inspected it. They could find no reason for the trouble except that the soil on these weak patches was rather loose, while on the better portions of the crops, it was much firmer. They attributed the looseness of the soil to deep cultivation, but my opinion is that the real cause was the absence of root growth in those patches owing to the fertile surface of the soil having been blown away. The paddock received the same cultivation all over, yet why the difference in the result? Firming down by ramming with a broad-faced rammer was suggested by one of the officers, and this was tried, but without beneficial result, and the crop finished out very patchy.

Take-all.

Prior to 1932, we had practically no take-all, but in that year we had our first serious experience of it. It started on a wind-blown patch at the end of an old track, and spread over a considerable area of the paddock late in spring. Again in 1933, we had a crop of wheat on well worked fallow. Sown early it germinated well, but soon began to

[*Papers Read at Conferences.*]

show yellow patches. These occurred in all cases on wind-blown patches, and in all cases the plants made poor growth. Later, take-all developed and spread over a large area of the paddock until a crop—which, if it had been normally healthy—would have yielded 10 bags to the acre, finished up by yielding four bags.

We were told when we came here—having had no previous experience of mallee conditions—that we would never be able to grow crops on old waggon tracks, but this was not correct as we had two of them running right through our place. In both cases they have practically disappeared, and have been filled up with drift, showing that crops will grow on land from which the surface soil has been removed if that surface soil be returned or replaced by something of equal value in fertility.

In our light sandy country, we lose more from having the fertile top layer of our soil blown away by the wind than from any other cause, that is in relation to our ability to grow crops, grass, &c. The question is—how to combat the trouble? This can be done to a large extent by correct methods of cultivation, and by using sheep to control weeds. All fallowing should be done as early as possible, not later than the middle of August, subsequent working to follow as soon as possible, and unless the spring is particularly wet and late, all such working finished by the end of September. That ploughing should be of a fair depth—not less than 2½in. in the shallow places, nor more than 4in. at the deepest parts. Very shallow ploughing is a mistake, for during a windy year when only the surface is loosened, practically the whole of the surface blows away, while if ploughed deeper and turned right over, the poorer underlayers are brought to the surface, and it does not matter so much if some of that is blown away.

As economy in production is absolutey necessary, it is essential to confine attention to the acreage which we can work thoroughly at the proper time, and that a thorough working be given directly before seeding.

METHODS OF FALLOWING.

[By G. SUTHERLAND, Copeville.]

There are several reasons for fallowing, chief among them being to clean the ground, aerate the soil, conserve moisture and spread the work more evenly throughout the year.

To grow crops successfully and profitably, it is necessary to have a firm bottom for the seed. The crop on loose patches goes off quickly when there is a burst of severe warm weather. Most of the fallowing in the mallee is done too deeply. If we fallowed to a depth of 1½in. to 2in., we would get better results, for if you rip up this country deeply you cannot get it down firm again unless the season is very wet, and we are not blessed with many of these. Again, the land is so uneven, that each time it is worked, the cultivator always comes on to the high and low places at a different angle, and therefore the deep working continues.

It does not matter what kind of implement is used for the initial working, so long as the work is done before grass and weeds are too big. I do not favour ploughing so that every weed and blade of grass are turned in. In fact, I prefer the other way. I would sooner see the rubbish and some of the grass left in lumps on top, so that an odd bunch of grass &c. will not die; they will help to keep the soil from drifting.

I used to hold the opinion that the more the fallow drifted the better. I have come to believe that if the drift can be stopped the crop will be more even, for if fallow drifts it blows into holes or hard bare patches, and the soil that is blown from these places banks up over the nearest ridge, and before long a soft drift bank forms, on which the crops soon blight off. A crop off the hard, bare places is not so good as from the fallow that has not blown.

For the initial working I do not, and would not use the heavy share plough, only where the ground has become too hard for a lighter and wider implement, or where it is desired to pull out stumps. The chief objection to the heavy plough is that it is

almost impossible to keep it shallow enough on sandy ground. I refer chiefly to the front wheels, the depth adjustment on them being the collar with a set screw on the standard or upright part of the axle. Where the ground varies, and which it does several times in a round on most farms in the mallee, the front wheels must be set to a depth at which they will do a job on the firm ground, then when the plough enters the lighter ground, the wheels sink, the depth is increased, and it cannot be avoided.

Latterly, I have been using a light skim plough or combine for the initial working. The skim plough cuts out the soil in small sods, and does not turn much more than half of it; and then, when the paddock is showing a fair tinge of green on it, it is worked again, chiefly cross-ways, which still leaves the ground soddy or lumpy. After one or two workings like that and warm weather approaching, the grass in the lumps dies, but they still hang together and that helps to hold the drift. After harvest, if a rain falls, run over it very lightly, little more than covering the share, and with another working ten days or a fortnight before sowing, the fallow should be in good condition.

DESTRUCTION OF FOXES.

[By W. R. TRESTRAIL, Coomandook.]

Owners of sheep throughout the Murray Mallee have had a very trying time this year with foxes. Not only have many young lambs been destroyed, but full-grown ewes have been killed and eaten. The problem of the fox is a big one in districts where so much natural scrub is still in existence. It provides ideal hiding places for the fox, and often when hungry, a fox will travel 10 miles in search of food. To combat this pest, stern, strong, united methods must be carried out if the fox is to be destroyed. It is desired to stress the necessity for united action. It is no good an odd farmer poisoning and killing on his own property; all landowners must unite at a given period. The best time to destroy the fox is early in the season, during April and May. After June, the fox becomes too cunning to take baits. The best poison to use is strychnine; as much as will cover a sixpenny piece is the ideal dose for each bait.

The different kinds of bait are legion, and most folk have a kind to suit themselves. Perhaps the best obtainable are small birds, such as starlings and parrots. He has an especial liking for parrots. Shoot the parrots, and when warm, slit open the breast with a knife and insert the strychnine. Hang the bird on a wire fence or a dry bush and scatter a few feathers about to attract the fox's attenion. One point in favour of birds as a bait, is that they are not so readily devoured by dogs, and they will not poison magpies and other birds as will other meat baits. Other good baits are the head and liver of a rabbit, head of a fowl, liver of a sheep cut into 1in. cubes and fried in fat, mice, and small fish such as sardines. Handle the baits as little as possible. I keep an old knife and fork for the purpose. The following is a simple way of preparing baits from a piece of caul fat. The fat is melted down, but before it is quite cold again, it is rolled between butterpats or similar pieces of wood into round balls, about the size of large marbles. When the required number of balls has been made, obtain a skewer with a sharp point, and after heating, make a hole in each ball to the required depth. Immediately, by means of a glass dropper, drop in a little dissolved strychnine. If this is done quickly, the cold strychnine will make a self-sealing cap in the warm tallow. When finished, tip the baits into a can of cold water and leave them there all night.

To set any of the above-mentioned baits (with the exception of the birds) drag a trail in the evening of a couple of half-roasted rabbits or a sheep's paunch a few days old. Either tie it to the axle of a vehicle or pull it along with a piece of rope on horseback. If it is from a vehicle, tie as well, a lump of iron to make a definite mark, in order to follow the trail next day. If possible, set the trail on open country and a fallow paddock. Lay the trail about two miles in length and place the baits about 10 chains apart and mark in some manner the place where the bait is placed.

[*Papers Read at Conferences.*]

Partly bury the bait. If the baits are not taken within a week, they should be gathered and burnt. One of the most important methods, and the most successful, is that every dead lamb that is found should be poisoned, especially if the fox has partly eaten it. Cut open the ribs and place strychnine on the liver, another lot in the hip and also on the tongue. When a sheep is found destroyed, place several lots of poison in the carcass. I have obtained as many as four foxes from one carcass in this manner. This method is very effective early in the season.

Foxes may be decoyed by means of a fox whistle and shot and hunted at night with a car or truck with a spotlight. Another method to prevent losses is to yard the sheep at night when the ewes are lambing.

To skin a fox, the easiest method is to skin like a rabbit, and open up the skin afterwards. It is advisable to peg out as soon as possible after skinning, as squarely as you can. Bury or burn all the carcasses of the fox; this will reduce blowflies and prevent cattle chewing the bones which may poison them. Again I make the plea that all farmers—whether they keep sheep or not—take united action early in the season to cope with this pest that is becoming an increasing and expensive nuisance in the mallee districts.

SOUTHERN CONFERENCE, STRATHALBYN.
August 16th.

FARM MANAGEMENT.

[A. H. Paterson, Strathalbyn.]

No one could hope to deal exhaustively, in a paper of this kind, with this subject. For successful farming the production of good crops and stock and the maintenance of soil fertility are fundamental. But more is required, for farming is a business, and business methods are as important as production methods. In a difficult period such as we are passing through, there is always a danger that we will lose heart and be content to muddle through. Granted that the difficulties of the farmer are very real, we should remember that depressions are not new; there was, on the average, a depression every 10 years during the last century, and there will be, unless the unexpected happens, depressions in the future; granted that the difficulties are very real, it is the man who is prepared to keep careful records and organise and cheapen production in every possible way who will eventually win the greatest success.

Business Methods.

A reluctance to keep records is a feature of farmers in general. Too often there is a failure to realise that nowadays farming has become a business. A generation ago a farmer was primarily a labourer. Physical strength and skill were his greatest assets. More is necessary nowadays. If crops and stock are produced at too great a cost and marketed unwisely a farmer may make very little headway. There must be a proper adjustment of capital, land, labour, and equipment. There should, for example, be no more land than the capital and equipment can handle to its full capacity. No more money should be invested in implements than can be used with profit on the land available.

A farmer should know thoroughly the market on which he has to compete, something about the regions in which his competitors work, and something about their methods.

The farmer of to-day has to farm land of much higher price than his predecessors —land which may have been depleted of its fertility by years of improvident farming. This lessening of fertility may have been masked by the better varieties

of plants grown and better manurial practices, &c., but in many cases must eventually show itself. More farmers fail because of faulty management than because of faulty production.

The principles underlying the raising of crops and stock do not alter, but the proper organisation of a farm may alter with every new invention. More farmers fail because the size of the farm or the methods employed do not keep men, horses, and machinery fully occupied than because of poor crops.

The kind of business ability needed is that required for the organisation of a farm into a successful business enterprise. An idle horse in the barn is a more frequent source of loss than is a bad bargain in buying a horse.

If the farm is large and requires a large amount of capital, the farmer should be capable of building up a good organisation and correlating the various branches of production. If the farm is small, the farmer must know how and when each section of the work should be done, and he must plan ahead and foresee most things liable to go wrong.

Bookkeeping.

How is a farmer to make a start to apply these ideas? A very simple system of bookkeeping will suffice. The first step is to draw up a balance-sheet. The balance-sheet consists of two columns—on the left liabilities, what the business owes; on the right assets, what the business owns. The excess of assets over liabilities represents the capital value of the business. Assets minus liabilities equals capital.

The capital value is placed under liabilities to balance the account. The drawing up of a balance-sheet involves the valuation of assets. Records should be kept from day to day of all transactions. It is sometimes difficult for the farmer to find sufficient time to attend to the books, so that it is preferable for some other member of the family to keep the records.

A receipts and payments account should be opened by entering the bank balance from the balance-sheet. From then on during the year all receipts and payments should be entered. A diary should be kept of all transactions in which payment is not made immediately. A valuable method of keeping check on one's books is to pay all money received into the bank and to make all payments by cheque. If this is done the bank pass book and the heel of the cheque book will be valuable records. Petty cash can be provided for by drawing a cheque in one's own favour as required. To separate various sections of the farm work, such as wheat, sheep, etc., a tabular receipts and payments book may be used.

At the end of the financial year, or at any time during it, a balance-sheet may be drawn up for the whole farm or for any section of it. By comparing the amounts shown as capital it is easy to see whether the business has progressed or not. Profit is an increase in the capital value of the business (including actual cash). It is not safe to think the increased bank balance is all profit.

To draw up a balance-sheet at any time, it is necessary to value all assets of the business, such as land, buildings, fences, stock, and plant. Depreciation in the value of assets must be allowed for according to their estimated life.

Any money withdrawn during the year for personal use should be added to the profits. A business which is in a healthy condition should return interest on the capital invested.

With such a simple system of bookkeeping in operation, a farmer knows just where he stands financially and, what is equally important, he knows how much each crop or sideline is helping or hindering the general position. Analysis of the records will also reveal important facts such as, for example, the cost of running a motor truck.

The keeping of financial records of each section of the farm business will point the way to further improvements. I refer to all that is included under the

heading "Production Recording." Any enthusiastic farmer will find such recording a fascinating interest. To know exactly the capabilities of each cow in the herd, or the result of a change in feeding or other management, is very valuable information.

PRODUCTION METHODS.

The production of good crops and stock and the maintenance of soil fertility are the foundations of good farming. A system of crop rotation should be adopted which will ensure the maximum production, consistent with keeping the soil in good heart. The effective utilisation of horse and man power depends very largely on having a suitable rotation.

I have been interested recently in the suggestion of a local retired farmer that an improvement could be effected in the usual rotation system by leaving pastures down for a longer period. This idea receives support in the June, 1934, Western Australian *Journal of Agriculture*. Western Australian experience has shown that with a rainfall of over 16in. the first Early or Dwalganup strain of Subterranean clover will establish itself quite satisfactorily. With less than a 16in. rainfall Burr trefoil and Cluster clover are the main pasture constituents.

Over 16in. rainfall the suggested rotation is:—Five years' pasture, crop, fallow, crop, fallow, crop. This would mean 500 acres pasture, 300 acres crop, 200 acres fallow on a 1,000-acre farm.

This division assumes units of 100-acre paddocks, in order that each year one paddock is changed from crop to pasture and one paddock from pasture to crop. Experiments have shown that better results are secured by grazing paddocks in rotation. If the area is fed off rapidly and the stock moved more often the pasture will yield much better. It is probable that twice as many sheep could be carried with 50-acre paddocks as with 200-acre paddocks.

For lighter rainfall areas, the basic rotation suggested is:—Four years' pasture, fallow, crop, fallow, crop, fallow, crop. This would mean 400 acres pasture, 300 acres fallow, 300 acres crop on a 1,000-acre farm. Modifications of these rotations may, of course, be made to suit individual requirements.

The chief advantage of these rotations is that much heavier pasture growth is obtained. The first year of a pasture would be very often more accurately described as a stubble period, and if the pasture is to be semi-permanent, it will repay extra expense. It is therefore suggested that the pasture should be top dressed annually with 50lbs. to 100lbs. of super and clover seed broadcast with the previous crop; or after the crop with the first winter rains, 2lbs. per acre of cleaned seed, free from burr, for Subterranean clover, and 1lb. for Burr clover or Cluster clover.

After a few years it should be possible to collect enough seed in burrs from the older-established pastures by raking during the summer. It will be necessary to cultivate Early Subterranean clover before raking to bring the seed to the surface. Collect seed from paddocks free from lucerne flea or red mite if possible.

The chief advantage of the rotation is the greater bulk of pasture obtained, which results in a greater amount of humus in the soil. Weed control and control of diseases and insect pests will also be much better.

The importance of legumes, such as clover or pease, in a rotation, cannot be over emphasised. These plants have the power of manufacturing the valuable plant food, nitrates, from the air.

The farmer must try to discover the point at which increased labour and fertility applied fail to yield a more than corresponding increase in crop return, and then endeavour to reach it but not pass it. A farm can be overworked, and the best crop that can be grown will probably not be the most profitable.

An aspect of farm management brought much before our notice by a year such as this is fodder conservation. Ensilage is a much-neglected method of storing fodder. It is fire, mouse, and weather proof, and is particularly valuable

when little greenfeed is available. The subject is exhaustively dealt with in a Departmental bulletin by Mr. Spafford. Other subjects which suggest themselves are weed and pest control, the handling of implements and machinery, construction of farm buildings, animal breeding and feeding.

In conclusion, the attitude of the successful farmer should be one of progressive conservatism. The progressive farmer will be ready to accept new ideas from any source, and, if they appeal to him, to test them out in practice. The ideas of agricultural scientists, agricultural journalists, business men, mechanics, and neighbouring farmers should receive due consideration. In any community where agriculture has been well established for some time the prevailing tendency of the majority of farmers is towards correct methods of cultivation. By carefully studying these methods it may be possible to make improvements. By a policy of progressive conservatism and a capacity for taking pains, there is the greatest chance that success will be achieved.

CARE AND MANAGEMENT OF THE POULTRY YARD.

[D. J. TURVEY, Milang.]

A survey of many farms indicates that one of the principal causes of impaired health and high mortality in poultry is due to inadequate housing. The farmer is inclined to keep increasing the number of his poultry and still crowd them into the same housing accommodation; over-crowding is a very dangerous practice, and often very unprofitable. I would rather have 100 well bred and well grown pullets than 200 that have been over crowded and insufficiently fed and cared for; it is not only eggs that we should look for, but we must realise that from these pullets we are to select breeding hens for future stock.

I have seen some farm fowls roosting in trees in all weathers, and their owners say that they do as well there as in a shed. It might do for a hen that only lays about 70 to 100 eggs a year; for such hens to be profitable their days are past, especially at the present prices of eggs, but with proper housing and feeding they are laying nearer 200 eggs a year. The official Victorian record is 337 eggs in 365 days; this should be convincing enough to see that fowls are given proper feeding and housing.

The farmer intending to build a poultry house should write to Mr. C. F. Anderson, Government Poultry Expert. I advise building his standard 100-bird house to start with, which is 20ft. long, 17 ft. wide, 7ft. 6in. high in the front, 6ft. high at back.

Having the ability to "pick the layers" is one of the prime essentials of successful poultry farming. The need for that particular ability arises when one is "mating up" for hatching operations, or when selecting laying pullets, or when the whole flock needs to be culled. Culling also plays an important part towards successful poultry farming.

First, look for the fowl with a good, smart, active appearance, moving about quickly—a fowl that appears to be constantly on the move, usually in search of food overlooked by her companions, or perhaps hunting for insects. Such a fowl is a worker that scatters the litter in a vigorous manner. The dull, inactive, slow moving and lazy hen is seldom a good layer.

Much guidance is obtainable from the head. Look for a strong beak, not too long and nicely curved, and bold, bright eyes. The comb should be of medium size and fine texture, wattles and ear lobes thin and smooth like a kid glove; head long, with inclination to be lean and narrow at back, and neck fairly long; the body should be long and deep with good width across the shoulders. The feathers should be close and tight-like in appearance. Fairly late and gradual moulters are generally the best layers. Quite a number of people now cull the hens solely

[*Papers Read at Conferences.*]

on the basis of those moulting by the end of January. However, this system may be somewhat drastic. On handling a laying hen the pelvis bones should be wide apart, the breast bone forced well down away from the pelvis bones, hence we get the scoring capacity of a hen from the distances apart these respective bones happen to be, the ideal distance being four fingers breadth between the two pelvis bones and five from the keel or breast-bone to the pelvis; these bones should be fine and not coarse. The quality of the skin is another indication, and heavy layers usually possess a skin with a soft, velvety texture.

The selection of the male bird for the breeding pen is of great importance; it is very hard to obtain all the desired points in a bird. The best idea is to get as many good qualities in the hen as possible, and then select a male bird who is strong in those points in which the hen is weak. If you mate two birds with the same faults then you will increase the faults. The influence of the male bird is most important in this regard. If you mate a bird with, say, 10 hens, each hen will be the mother of, roughly, one-tenth of the pullets, but the faults of the male bird will probably show through the whole number. Always be sure and select a male bird with good depth.

For egg production there are only two breeds I would consider—White Leghorns and Black Orpingtons, in that order of preference. On no account feed these two breeds together. The Black Orpington being a larger fowl needs more food, and the White Leghorn, being a more active bird, will pick up three grains to the other's two. If a farmer with the ordinary knowledge of poultry was given a large number of hens of each breed, he would find that he was able to keep the White Leghorns up to a high standard better than any other breed.

The feeding tests being carried out at Parafield prove conclusively that neither bran nor pollard is necessary in the composition of a good laying mash. No. 1 Test of crushed barley and crushed wheat and meat meal shows £3 13s. 9d. more profit than the No. 3 Test which consists of bran, pollard, and meat meal. These tests prove that we can carry on with poultry without having to purchase bran and pollard.

ALMOND GROWING.

[G. Sissons, Strathalbyn.]

The almond is a native of Persia, originally supposed to be a poisonous plant growing wild, that has since been improved by cultivation. There are two sorts of almonds, the bitter and the sweet; the sweet is the variety grown in this country, the bitter is grown in the south of Europe and North Africa for the extraction of its oil which is used medicinally and in the manufacture of flavouring essences.

So far as Australia is concerned, South Australia is the home of the almond. In most parts of the other States, except for a few varieties, the almond sets its fruit very sparingly, so that its cultivation appears to be a profitable industry here for some time to come. In the past the tree has been sadly neglected, being mostly used as a breakwind, the nuts just planted and left to take care of themselves; possibly the cause for this has been the cost of labour for harvesting, but since the introduction of machinery for hulling and cracking the nuts, the almond is now coming into its own. There is still, however, the need for a reasonably priced cracking machine to suit the needs of the small grower. Grown for commercial purposes, the almond is usually budded on peach or almond seedlings. Perhaps the most reliable way of getting the variety one needs is to grow and bud one's own seedlings, being sure to use buds from well-established proved bearers. On the whole, it is a better proposition to procure the young trees from a reliable nurseryman and save the loss of one or perhaps two seasons. Before deciding on the varieties to plant, I advise a canvass of the district to find out what sorts

suit the locality. When selecting a site, a well-drained position, free from frosts, and away from growing timber, should be aimed at; if grown near timber I advise planting hard shells. The cultivation of the land should be as thorough as for any other orchard tree, deep-ploughing in the first place with plenty of after-working. The trees should be planted not less than 25ft. x 20ft. apart but 30ft. x 20ft would be a better proposition.

They should be cut back hard for the first two seasons and kept pruned for 4 or 5 years. If spring and summer pruning can be done, it will save a lot of cutting and conserve the energy of the tree. With upright growers like Brandis, the centre should be cut out and the remainder pruned to outgrowing buds. The spreading varieties need to be cut back to in or side buds for several years, making the branches go upwards, permitting close-up cultivation, also the twigs should be thinned out occasionally, preventing the tree becoming too bushy and preserving the identity of the main limbs. These branches or secondary arms must be given plenty of room and not be so numerous as they can be in the Brandis. Old trees whose wood is becoming exhausted from bearing should be renewed by cutting back branches to the secondary arms, extending the operation over three or four years.

Eleven years ago I planted 400 trees, and at the start made two serious blunders —one was planting too closely, so that now I have to grub a third of the trees in one block; the other was relying on the descriptions given in a catalogue instead of finding out what sorts suited my locality. The varieties I planted were:—Brandis, Ne Plus Ultra, Imperial, Commercial, I.X.L., White Nonpariel, and Jordan (hard shell). Of these, I have had the best results from Brandis, I.X.L., and Imperial—the Brandis being the best weighers and most consistent bearers. Ne Plus Ultra has been the most prolific, but failing a wet summer it is almost impossible to hull them, so most of them have been cut down and budded to Chellaston and Johnston's Prolific. Commercials were no good. They were cut down and budded afresh. White Nonpariels were the worst bearers of all, although they flowered profusely every year; they were cut down and re-budded. The hardshells suffered the same fate for the same reason.

Seven years back I planted 135 Chellaston, and so far they promise to be my most profitable investment; the nut has rather a poor appearance, but they are the best of weighers, and have a good, plump kernel. Three years ago I budded Stockholm's on White Nonpariel stumps; last year there was a nice sprinkling of nuts, and this year a good crop. They produce a fine, large kernel, but the shell is easily torn. Seven years ago I budded Johnstone's on Ne Plus Ultra stumps; they have borne good crops, but this year did not open well. I think they need more moist conditions.

As an experiment Johnston's were budded on prune stumps two years ago last summer. The buds have grown well, and with the exception of one tree there was no gumming. They bore a few nuts last season, and are now covered with blossom.

HILLS CONFERENCE, COROMANDEL VALLEY, AUGUST 23rd, 1934.

GREEN PEACH APHIS (*Myzus persicae Sulz*) AND ITS CONTROL.

[By R. FOWLER, Manager Blackwood Orchard.]

The first severe infestation of Green Peach Aphis occurred in 1924, and a second in 1928 at the State Expermiental Orchard, and, I think, in South Australia generally. Up to that time, though present occasionally in small numbers, it had not been responsible for any severe losses, nor had any efforts been made to learn anything of its life history or means of control.

[*Papers Read at Conferences.*]

After the outbreak in 1924 it became apparent that this pest's potentiality for doing damage and causing loss to peach growers was tremendous, and that steps would have to be taken to discover, if possible, some effective means of control. The ordinary methods of combating aphis, used with success against black aphis, were tried against the green aphis in 1924, without success, and we then turned our attention to winter washes, and all subsequent trials have been with egg killing spray materials.

From our experience and observations since the first epidemic in 1924, it is apparent that a general outbreak of green aphis in great numbers occurs at irregular periods of three or four years, when considerable damage to the peach and nectarine trees results, with a serious loss of crop; and in the years when not in plague numbers, sufficient damage has usually been done to warrant the application of a winter spray; so that the position has now been reached when it would appear to be uneconomic not to apply a winter spray as an insurance against loss by green aphis.

A great deal of experimental work has been done since the outbreak in 1924, and the life history of the green aphis has received considerable attention since then, particularly by Mr. K. M. Ward, of the Victorian Department of Agriculture, who recently published in the Victorian *Journal* the results of some years of research work. At the present time three problems still confront the grower, and research work is still needed to determine whether—

(1) It is possible to forecast severe outbreaks of green aphis by studying climatological records, and observing the numbers of migratory females that return to the peach trees in the autumn, and the numbers of eggs to be found on the peach laterals.

(2) Is it possible to achieve complete control of green aphis by means of ovicidal or egg-killing spray materials?

(3) To determine the most efficient of these winter spraying materials, and the most economical ones to use.

Life History of the Green Aphis.

Some confusion still exists in the minds of growers as to the manner in which the various species of aphis—black and green of the peach, black of the cherry, and woolly aphis of the apple—hibernate during winter and re-infest the trees in spring. Without a proper knowledge of the life history of these insects at this period of the year it is impossible to deal with them intelligently.

The life history of the green aphis under Australian conditions has now been thoroughly investigated by Mr. Ward, and much useful detail has been obtained; but previous to this in South Australia Dr. Davidson, of the Waite Institute, had determined, from material supplied from the Experimental Orchard, that the migratory females returned from the summer host plants to the peach trees in May, and that eggs were to be found on the laterals in June and July; so that it is known that this species does deposit eggs on the trees during the winter, and that egg-destroying winter sprays might be used with some chance of success.

The life cycle of the green aphis may be briefly stated as follows:—Eggs are deposited during late autumn, singly, mostly on the 1-year-old laterals, the eggs being placed in the axils of the buds or in crevices of the bark. The eggs are at first light green in colour, changing to a shiny black in three or four days and hatch during midwinter and early spring giving rise to the stem mothers. These feed at first on unopened buds and develop into the adult stage slowly. These forms are apterous, *i.e.*, wingless ,viviparous, *i.e.*, produce living young and being parthenogenetic, they do not require fertilization by the male of the species. Their progeny are wingless and develop more quickly than the previous generation.

They feed on the blossoms, opening leaf buds, very young fruits and leaves, and it is the swarming of this generation which causes the early curling and distortion of the leaves, so characteristic of the early spring injury. Later, when growth on the peach and nectarines has further developed, a third generation appears which feeds on the leaves and shoots. In this generation alate or winged migrants begin to appear, and in later generations increasing numbers of migrants are produced until all adult aphids are winged.

A complete change now occurs in the feeding habits of the insect. It leaves the primary or woody host and commences to feed on secondary host plants, which are herbaceous, such as Cape weed, marshmallows, and garden plants, weeds, &c., and their progeny carries on the life cycle of the species on the secondary food plants.

During April and May the return migratory forms begin to appear on the peach trees, and close observation will reveal the winged female, with a colony of eight to ten young round her, generally on the upper surface of the leaf and near the midrib. It is thought that the autumn migratory flights are probably over short distances only, as it is noticeable that the outside rows of a block of peaches generally carry more of these migratory forms than the inside and more eggs are generally found on trees near the headlands than on those further away.

The small colony of 8 or 10 young produced by the autumn migratory forms consists of oviparous or egg-laying females. They are not green in colour, but rather a shade of red and brown, somewhat the colour of the laterals or leaves on which they feed. These sexual females are fertilized by the migratory males which come from the summer host plants. The egg-laying female may lay from 7 to 13 eggs over a period of 20 days. The stem mother may produce up to 60 living young. The third and fourth generations mature more quickly than the first and second, and produce about the same number of living young.

This life history information is based on K. M. Ward's studies, and our observations in the Experimental Orchard, where this pest has been under observation for some years. In Victoria—and I think the same would apply in South Australia—Mr. Ward found that the duration of periods of activity was as follows:—

Autumn migration—April 20th to May 30th.
Autumn generation on peach—April 20th to June 18th.
Oviposition—May 5th to June 16th.
Hatching—June 28th to August 23rd.
Destructive period—June 28th to December 4th.
Over-summering period—December 4th to April 20th.

In the above Table it will be noted that eggs are laid between May 5th and June 16th. This has an important bearing on the time the winter spray should be applied. To get the best results it is necessary to wait until the last migratory female has returned to the peach trees and has finished laying her eggs. Apparently this could be towards the end of June, so that any time after that would be an effective time to apply the spray. During a normal winter, when the weather is usually wet and boisterous in July, it might be possible to get the spraying done before the ground becomes too saturated with water, making it almost impossible to get the spray pump over it.

The damage done by the green aphis to the peach tree is twofold. The stem mothers, when they emerge from the eggs, commence to feed shortly after hatching, and draw their food supply from the leaf and flower buds. This must inevitably interfere with the normal development of the bud. By the time the blossom buds are opening many of the first generation have been born, and these attack the various parts of the flower, resulting frequently in its destruction, and

no doubt the killing of many flowers results in a lighter crop being produced. After the blossoms the aphid attacks the young leaves which are just forming, and when in plague numbers the effect of their presence is seen in the curled-up condition of the leaves. As a result the young laterals, which should bear next season's crop, become stunted and distorted, and so weakened that they are not in a condition to bear fruit; so that the crop immediately following the plague year is also more or less affected by the previous season's infestation.

In 1924 and 1928, both plague years, in many instances the upper portions of some trees were so badly injured by the attacks of green aphis that many of the leaders died out, and not only was the new season's growth distorted but the actual framework of the tree itself was more or less destroyed.

Growers will have to study their own conditions to some extent, because all peach orchards do not suffer to the same degree, even in a plague year, and in the off years some may suffer badly while others escape altogether. Again, some orchards may be subject to attack almost every spring. What determines the severity of the infestation in these cases it is hard to determine. Probably one factor is the proximity and abundance of the summer host plants.

Control Measures Adopted.

Our first experiments were carried out in the winter of 1925, after the severe outbreak in 1924. We then used red oil, black leaf 40 and soap, and lime sulphur. These tests were repeated in 1926, but there was only a slight infestation in that year. Lulled into a sense of false security, we did not put out any winter sprays in 1927 and 1928, and as a result were badly hit in the latter year. After the infestation occurred we tried black leaf 40 and soap, red oil and soap, black leaf 40, and nicotine dusts, but with very little success. In the winter of 1929 we again used red oil, white oil, Kleenup, rustica salus, and lime sulphur. In 1930 we repeated most of the 1929 programme, and included Mortegg and Cooper's tar distillates. There was rather a bad infestation of green aphis that year.

In 1931 and 1932, owing to extremely wet winters, no winter spraying was possible. Again we tried to control the green aphis with spring sprays and by using white oil mixed with Burgundy curl-leaf spray, but did not get satisfactory results. Tests were also made with other proprietary lines mixed with Burgundy, but no satisfactory results could be claimed.

Results of Experiments.

From observations made after these tests were carried out it was evident that if the aphides were allowed to reach the stage when the leaves became curled and distorted then it was almost impossible to reach all the insects with a contact spray, and repeated attempts to do so would prove costly and uneconomic. The only solution seemed to be the winter sprays. Of those used, speaking in general terms, the most effective have been the tar distillates. The oil sprays applied in the autumn proved fairly effective, but not absolutely efficient. The oil sprays, however, seem to have a general beneficial effect on the trees themselves. Experience has taught us that the time sulphur, black leaf 40, and nicotine dusts in these experiments were applied too early. These materials would probably have given better results if used when the buds were just unfolding in early spring.

In 1933 we again put out a number of winter washes, and in order to get a more tangible idea of the results, made a count of all the laterals affected by green peach aphis on the sprayed and check trees, assuming that the sprays had failed to destroy the eggs on these particular laterals.

TABLE I.—*Data in Connection with Green Aphis Spraying Experiment in Variety Block B. Record taken* 26-10-1933.

Date of Application.	Plot.	No. of Trees in Test	Spray Material Used	No. of Trees Examined.	No. of Trees showing affected Laterals.	No. of affected Laterals.
9/6/33	1	40	[illegible]	20	2	10
	2	40	Tar distillate Coopers 1-35.	20	5	14
	3	40	Gargoyle Red Oil, 1-25	20	6	43
	4	40	Destructol Emulsion, 1-35.	20	6	21
	5	40	Not sprayed, check rows .	20	12	63
	6	40	Kleenup, 1-35 .... }	20	6	16
		40	Lime Sulphur, 1-35 .... }			
	7	40	Alboleum, 1-33	20	7	19
20/6/33	8	40	Shell Red Spray, 1-20 .. .	20	5	13
10/7/33	9	40	Cooper's Ovicide, 1-40 ..	20	—	—

Trees unpruned when sprayed.

TABLE II.—*Data in Connection with Green Aphis Spraying Experiments in Elberta Block. Record taken* 25-10-1933, *and in Variety Block L* 27-10 1933.

Date of Application.	Plot.	No. of Trees in Test.	Spray Material Used.	No. of Trees Examined.	No. of Trees showing affected Laterals.	No. of affected Laterals.
20/6/33	A	12	Mortegg, 1-35............	12	3	8
10/7/33	B	12	Mortegg, 1-35............	12	—	—
10/7/33	C	12	Check row	12	9	46
			Variety Block L.			
10/7/33	D	18 }	Cooper's Ovicide	10	2	3
			Check row	6	6	110
17/7/33	E	18 }	I.C.I. Winter Wash No. 1 (6galls.-100)	10	—	—
			Check row	6	5	152
	F	18	I.C.I. Winter Wash No. 2 (6galls.-100)	10	—	—
			Check row	6	6	198

The figures show that the tar distillates gave almost 100 per cent. control, and the winter oils, though varying a little, gave some measure of control as compared with the check rows. Spraying was done at various times during winter, June 9th and 20th and July 10th and 17th, and the later applications gave slightly better results than the earlier applications.

The Imperial Chemical Industries Ltd. washes are made up on what is known as the East Malling formulae, and gave good results, as seen from the figures. At the time these observations and counts were made it seemed possible that the green aphis might increase rapidly, but the winged forms developed and then disappeared, and soon sprayed and unsprayed trees looked alike.

We have again applied another series of test sprays this winter, but it is too early to report on them yet, except to draw attention to the following Table, which shows the results of some examinations made by Dr. Davidson, of the Waite Institute, on the number of eggs to be found on laterals taken from trees sprayed with various egg-killing spray materials. The figures do not indicate very much, except that, in spite of the numbers of migratory females noticed in the autumn, comparatively few eggs were laid, but it must be remembered the length of wood examined is very small when compared with the total lateral growth on the tree. Most of the eggs were found on rows 15 to 18, these being next to the outer boundary headland.

[*Papers Read at Conferences.*]

TABLE III.—*Aphis Observations.*

Treatment.	No. of Shoots Examined.	Total Length of Shoots.	Eggs Whole Apparently Healthy.	Eggs Hatched or Damaged.	Young Aphides.
		feet.			
A. Rows 9-12	26	33	4	3	0
B. Rows 13-14	26	31	2	0	0
C. Rows 15-18	24	27	30	5	0
D. Rows 5-8	23	27	4	0	0
E. Rows 1-4	25	26	9	3	0

A. Sprayed Shellicide D 1 20 Nicotine Sulphate 1 in 800 on 25/6/1934.
B. Not sprayed.
C. Sprayed Gargoyle Red Oil 1 25 on 2/7/1934
D. Sprayed Crude Petroleum 1 20 on 25/6/1934
E. Sprayed Ovicide 1-35 on 25/6/1934.

Judging by the numbers of migratory females observed in the autumn, and reports of the egg counts from other districts, it is rather feared that next season may be a bad one for green aphis, and the Department deemed it advisable to issue a warning to that effect through the press and 5CL, which we hope reached most of those concerned.

TAR DISTILLATE SPRAYS.

Following on the more general use of tar distillate sprays, one or two questions have arisen:—

(1) The probable cumulative effect of tar distillate washes on the tree if applied year after year.

(2) Will any damage result if a frost follows soon after the application of tar distillate?

(1) So far no permanent injury is noticeable. Certainly there is some discoloration on the 1-year-old laterals after tar distillate sprays, but the injury, if any, appears to be only on the surface, and does not affect the subsequent growth or fruit bearing of the laterals. As most of these laterals are shortened back or removed when pruning the following season it is hard to see how any permanent injury can result.

(2) I have not heard or read of any injury through frost after using tar distillate. Our weather records show that on several occasions severe frosts followed the applications, but no injury resulted.

SUMMARY.

The question of forecasting outbreaks of green aphis is under consideration at the Waite Institute, but more data is needed before any predictions can be made.

It would seem that tar distillate will give almost perfect control of green aphis, and that it is the most efficient and economical spray material to use for controlling green aphis.

That it should be used strictly as a dormant spray, at a strength of 1-35 or 40, applied before the middle of July.

That winter oils have not proved as efficient as tar distillates.

That black leaf 40 and soap, if used, should be applied later than tar distillates.

That it is almost impossible to control green aphis with contact sprays after it becomes well established in the spring.

Considerable work has been done at the Experimental Orchard in an endeavour to find out the most efficient method of controlling green aphis, which threatens severe damage to peach orchards in the State.

[*Papers Read at Conferences.*]

That green aphis eggs are laid mostly on the laterals, and so therefore considerable numbers will be destroyed if the peach and nectarine prunings are carefully picked up and burnt.

It should be remembered also that tar distillate sprays have a burning effect on the skin, and the operator should take all precautions to protect himself and also the horse drawing the outfit. So far as the operator himself is concerned, he should protect his face and hands with either castor oil or some petroleum grease, and endeavour to carry out the spraying in such a way that as little as possible of the spray will drift over him. He will not, for instance, attempt to spray against the wind.

Trees may be sprayed before being pruned, but less spray will be used and a more effective job done if the trees are pruned before being treated.

ORCHARD DRAINAGE.

[By MAX J. VICKERS, Lenswood.]

This is a subject I feel very strongly about and one, I might say, I have never heard discussed at a Bureau meeting.

What mainly prompted me to attempt this paper was the realisation of the many mistakes I have made during the last 15 years and the possibility of other growers being equally unaware of the right methods of drainage. I am assuming, of course, that the method which I am now advocating is correct.

IMPORTANCE OF DRAINAGE.

In the Lenswood district, with a heavy rainfall and usually wet conditions in early spring, drainage is more than ordinarily beneficial. Of all drainage, subsoil drainage is, of course, the most necessary for orchards, particularly throughout our district, where, in many instances, even in comparatively short rows, there are three distinct types of soil frequently met with. Ironstone gravel on the top half, gradually merging into a brown loam, and finally into a stiff grey soil, or pipe clay, at the bottom of the slopes.

Water drains through the gravel, as through a sieve, but meets with resistance in the tighter soils, which forces it to the surface. The surface conditions which go to show the need of drainage are obvious and easily noted. Most stiff clayey soils require drainage and give tremendously increased results when so treated, added to which they are much easier to work when drained, and remain in condition longer, after being cultivated, without setting or forming into lumps or clods.

Indications.—Any flat or low-lying piece of ground on which the water lies for any length of time after rain "will not give much reward to the one who tills it until he tiles it also" is an adage I once read.

Soils upon which rushes, water grasses, ti-trees, &c., grow can be classed safely as soils which must be drained to get the best results.

Any piece of land you contemplate draining you will be wise to closely observe, during the wettest period of the year, in order to get a guide for the actual position of the drains, as frequently certain oozy, boggy patches, hard pans, &c., occur in unexpected places.

Systems and Types.—Many orchards in Victoria have a tile drain between every row of trees. While this system allows for the job being done piecemeal, a cheaper and better system is to plan out the drainage scheme before the orchard is planted and have the main drains further apart, with lateral drains of smaller dimensions at frequent intervals.

No drain should be longer than 400ft. without an enlargement of the size toward the outlet, that is, when using 2in. or 3in. pipes.

There are various types of drains in use. Many people have far more open surface drains in their orchards than allow for convenient working. Underground drains are in use made with brush; also slabs, placed crosswise on a ledge with a channel underneath; also split timber or poles placed longwise. Then th re are stone drains, and lastly mole-drains made by a recently devised mole-plough. These may be a success in this district with its pugnacious clay subsoil and freedom from sand patches which tend to cave in.

None of these are so thorough, long lasting, and efficacious as tile drains, however, and when the amount of labour entailed in laying them is costed up, are they so cheap?

Distinction of Conditions.—In relation to drainage there are two classes of water or moisture to be considered—that of hydrostatic water, and water or moisture that results from capillary action. The forces that give these two results are diametrically opposed in their action.

Without capillary attraction we would have no moisture left in our cultivated soils after the dry season sets in.

"Capillary attraction is best illustrated by the fact that we can half fill a bucket of water, and by putting in a strip of rag with one end resting in the water and the other reaching out over the top of the bucket, it will soon be found the water will drip from the end hanging outside the bucket. Briefly stated, it is the power of the water to rise through some agent and remain above the level of its source. Thus, we have an illustration of the wise provision of Nature, which provides moisture for all plant growth from the water stored down in the subsoil during the wet season." (I quote this from McHarg Bros. Tile Pipe Makers, Hobart.)

Another illustration I might give is, when we water a pot plant of, say the Gloxinia variety, by pouring the water into the saucer in which it stands, it is then drawn upwards by capillary attraction through the soil.

Hydrostatic water is that which is forced up to the level of its source, but is not able to rise any higher. Thus, if we dig a hole anywhere in wet ground during the wet season, it will fill with water to the exact level to which the surrounding country is saturated. Soil that is full of hydrostatic water will not grow anything.

Now we come to the reason why underground drainage gives the best results. If surface furrows or drains are used, these allow the fertility of the soil to be washed out; this particularly applies where bonedust and chemical manures are used.

By removing the surplus water down through the soil it not only prevents loss of fertility, which results from the wash, but actually adds it in the shape of one of the most potent forms of plant growth, nitrogen, which the rains bring down from the atmosphere. As this filters through the soil it is arrested and held by the soil particles and thus made available for plant food.

Subsoil drainage, it has been found, has the effect of keeping the ground warmer during the winter and early spring, thus encouraging earlier growth, also enabling one to get on the ground and plant earlier.

It has been found, too, that crops on well drained soil are not nearly so liable to frost injury as those on undrained ground.

Effects of Evaporation.—One of the reasons why undrained heavy soil is slower of growth early in spring is that there is so much water near the surface, which mostly has to be evaporated by the sun's rays before the ground can be warmed. Evaporation has a most chilling effect on the soil's surface or, for that matter, on any wet surface. Why do we fill a water bag and wet the outside? So that the water will become cool. This is brought about by evaporation from the surface of the bag, while the porous nature of the canvas allows it to continue.

[*Papers Read at Conferences.*]

Who has not experienced the feeling, when, after coming out from a swim, if the wind is blowing, one immediately becomes freezing cold. This is the effect of evaporation. Exactly the same thing happens with a saturated soil in early spring.

Drains act Horizontally, not Vertically.—If we drain our orchard we increase the depth of it, and thereby we increase the size of it. An agricultural drainage engineer of Missouri State Farm said:—"I drained my farm whilst in debt in order to get out of debt."

A common idea of the action of drains is that they draw the water directly down from above them. This is not so and is undesirable into the bargain. They draw horizontally. I know of persons who have ploughed an open furrow directly above the drains up the centre of the three rows to assist them. This is wrong practice and might result in their getting blocked with sediment. If you take notice of freshly cut banks of soil, you will see practically all soil or rock strata run horizontally and not up and down. The same thing applies to water saturation which really follows the openings between these layers.

All well sinkers, &c., know this. We know also that the pumps on different mine workings have lowered the water levels for miles around in various parts of the world. This is proof enough of the horizontal action of drains and of water through the soil; in fact, if it were not for this feature underground draining would be of little value. What we require of a tiled drain is that is draws from either side as far as possible.

If convenient, say, at a fence or headland, it is a good idea to have an upright pipe for an air hole in a long line. Immediately on this being provided it will be found that the pipe line, which may have been working sluggishly before, will instantly empty about three times the volume of water. This plan is particularly desirable where a pipe line empties into a creek or drain in which the level of the water may be a foot or two above the level of the outlet pipe.

Effective Position of Drains.—Much controversy takes place on where the pipes should be laid. Many advocate they should follow down the steepest slope, arguing that water drains down to the lowest level by the shortest available route, and that the suction of this action would pull the water out of the pipes laid across the slops or diagonally.

I, however, favour laying them across a slope just above the level where the water rises to the top soil. I find the land above, being freer, will drain itself, whilst my pipes catch the water as it comes down and carry it off, preventing it soaking in the low-lying land below, therefore effectively draining that.

No water-loving trees such as willows or poplars must be allowed to grow near drains. Their roots will force their way through the smallest opening and eventually clog the drain.

Methods of Installing Tiles.—In laying the pipes the ends should be quite close, in fact, touching. The suction draws the water through these intersections more effectively, it is said, than if they are left a quarter of an inch apart, leaving less chance for sediment to enter and clog.

I have held and outgrown a number of ideas during the last 20 odd years that we have been using tiles on which is the best way to cover them. At one time we carted ti-tree or brush and laid on top of the pipes before filling in. Then for years we used to cover them with 2in. or 3in. of a soft, shelly, flakey, slate-stone (of which there is a quarry in the middle of the place) to make the surroundings porous.

Then, after asking growers in various States and in other countries their methods, I find quite a good idea is to throw in the stiffest clay first and stamp it down, although possibly it pays to lay a strip of bark first on top of the pipes—a plentiful article in these parts—to prevent the entry of any foreign matter for the first winter while a re-setting or settling is taking place.

[*Papers Read at Conferences.*]

The action of tile drains has been found, after careful observation and experiments, to consist of taking the water in from the sides and underneath, and this is the action that we desire. The upper end of the drain should be blocked by a flat stone.

Conclusion.—In the foregoing I have endeavoured to give some of the reasons why we should drain, and of the benefits to be derived from it; and of the latter there is no room for argument in the negative, except that some will say it is an expensive job, but it if is going to permanently increase the productivity of our orchards it is well worth while. It will surely allow thousands of those anaemic-looking little rose-bush type of trees to grow into vigorous, 10-bushel, average ones.

Tile drains always appeal to me as faithful things Frequently, when going home at night in the wet season I have stopped and listened to the bubbling of the water from one of them, and thanked God something did not limit its hours of labour, but worked while others slept.

THE CARE OF THE LAMBING FLOCK.

[A. W. Robinson, Gumeracha.]

During the gestation period which is from 140 to 147 days (in the ewe) as with all pregnant animals, the main food needed by the ewe is proteins and mineral salts in order to meet the body formation and requirements of the young lamb. Ewes deprived of proteins will rob their own body systems to supply the needs of the young lambs. The result of this is unhealthy lambing, dead lambs, loss of ewes at lambing, poor milk supply in ewes, and consequently malnutrition or loss of lambs before weaning. During the gestation period and after lambing a daily ration of about two linseed sheep nuts—linseed cake broken into nut form—to breeding ewes increases lambing percentages, makes lambs stronger constitutionally, and better able to withstand marking and attacks of disease, enhances the milk flow in ewes, and also aids wool growth.

Percentage of Lambing.—Our lambing figures do not compare favourably with those of Great Britain, where the average sheep farmer expects at least 100 per cent., and often reaches 150 per cent., while many of the flocks average 120 per cent. year after year. These figures are the more striking when we compare our weather conditions with those of England. Our season is in mild or warm weather, while that of Great Britain is about freezing point. The English methods entail much more labour than is generally necessary with Australian flocks:—

1. The English-bred ewe is more prolific, therefore we should endeavour to breed crossbred ewes to get best results.
2. The English farmer is more particular in the use of sufficient rams, and more readily rejects old and stale rams.
3. He arranges shelter for lambing ewes, and has a shepherd in constant attendance. This shows that certain precautions are necessary to avoid needless losses.

Care of the Ewe.—Ewes should be handled with great care. Do not allow badly bred or badly trained dogs to rush about the sheep. A good, quiet dog will help to quieten the sheep, and should be trained to work well out from the flock. Any rough animal should not be used. It is a good plan, if possible, to arrange for a field near the homestead for the lambing paddock. The paddock should be well grassed with native pasture for preference, well drained, and clean and dry under foot. If possible, windbreaks should be in existence. Plant trees on the windward side of the paddock and, in fact, all the stock paddocks should have breaks for the comfort of the stock generally. Usually it is adviasble to divide the flock before lambing, picking the ewes that are likely to lamb early. The picking of sheep heavy in lamb can usually be done by feeling the udders of the

ewes. At the same time great care should be taken not to roughly handle the ewe when doing this. Under our own conditions it is not usual to have a man specially engaged for the care of the lambing ewe, nor is it absolutely necessary. With the paddocks as close as possible to the homestead, and the services of a good hack, one man can attend to 500 ewes in about three hours, providing the weather is mild. He should go round the flock twice a day, keeping a sharp lookout for ewes that are about to lamb It is not wise to interfere too early, as Nature will right itself, and damage is often done by interfering. It is wiser to leave a ewe and return to her an hour or so later. If assistance is needed it should be done with great care. The normal presentation is the forefeet, followed by the nose, and with this little difficulty is experienced. Often, however, presentation is at fault, and then difficulty arises. Should any great difficulty be encountered, the lamb should be gently pushed back into the womb, turned round, thus correcting position, and then, as in normal cases, proceed to draw the lamb gently downwards and outwards. It is a cruel procedure to attempt to draw a wrongly presented lamb, and should, therefore, be avoided. Nature provides plenty of room for the turning of the lamb in the womb, and hence little difficulty will be encountered if this is done Experience will teach a man thoroughly. Cleanliness must be observed, and it is a good plan to anoint the ewe with carbolic oil. If a ewe will not take a lamb a good plan is to tie her up, or pen her in a small yard with the lamb—perhaps the ewe will have to be held for the lamb to have a drink. Another good plan which has proved successful is to smear the lamb with the ewe's milk, and also smear the ewe's nose with her own milk to which a little bran has been added. A motherless lamb may be placed on a ewe which has lost her own lamb by adopting the above method.

During rough weather it is advisable to carry a small bottle of olive oil or brandy. Often a little olive oil will revive a weak lamb. Bringing a lamb into a warm room will often revive it. Should the ewe be lost it is a good plan to thoroughly wash the lamb in a bath of a temperature of about 103 decrees, and thoroughly dry and wrap in a warm covering. As the lamb does not get the "colostrum" milk of the ewe, the nearest approach is cow's milk, half pint fed through bottle and teat. Add to the cow's milk one teaspoonful of sugar and the white of an egg per day to supply the extra albumen that is in the colostrum milk of the ewe. Lambing pens have been found useful in wet districts. A yard 1 chain square is enough for from 200 to 300 ewes. This yard should contain a small haystack where the ewes will be able to nibble and also keep themselves dry under foot. This shelter should prove useful on the farm for other stock during the part of the year when not used for lambing. Lambing pens also encourage ewes to feed from troughs. This should be necessary.

Tailing.—This should be done when lambs are young. It is not advisable to wait until all the lambs have been dropped, especially if the lambing is a protracted one. The best age is about two weeks The knife is the quickest and easiest, and the stump heals more quickly than after the searing iron. There is some risk, however, of the lamb bleeding to death. Much bleeding can be prevented if the lambs are tailed in cool weather, and the flock should be rested both before and after tailing. The searing iron stops bleeding almost entirely. It has a tendency to cause a scab, and does not heal so quickly as with the knife. The iron, should be kept at an even heat; a white-hot iron will often injure a bone with fatal results. Lambs should be done young. Another method is to cut with the knife and sear the main artery with the iron. This stops bleeding without forming a scab. Earmarking should be done at the same time as tailing, and every farm should have a distinctive earmark. Ewes and lambs should be pastured on some prepared crop of either rape or barley. It is advisable to change the paddocks as often as possible; *i.e.*, daily, instead of once a week. A good plan is to let sheep feed on

ordinary ration through the night and morning, and turn on to, say, rape in the afternoon. This allows them to gain much more feeding value. Care should be exercised in the detection of scouring if such should occur. Concentrates such as crushed barley or oats are helpful. If a lamb is to be sold at 4 to 4½ months it is much better to sell direct from the mother. If the object is to sell a 50lbs. to 60lbs. lamb, which means holding the lamb for six months, then weaning is probably the better method.

CONFERENCE AT YEELANNA, EYRE'S PENINSULA BRANCHES, September 5th.

SEED WHEAT.

[R. R. WILSON, Yeelanna.]

Conference at Yeelanna, Eyre's Peninsula Branches, September 5th.

The wheat grower cannot pay too much attention to the character and quality of the seed which he uses if he desires to secure the best results. It is not sufficient to sow a good-yielding wheat and neglect the quality. Both are of great importance to growers, who should select a wheat possessing quality as well as yield. Ford is one of the most suitable for this district, and this variety is also a very fair hay wheat if there is a better demand for hay than grain.

It is often said that shrivelled grain is the best for seed, because there are a larger number of seeds per bushel, and lighter seeding would be required. This is wrong; we should regard seed wheat in the same way as breeders of livestock look upon their animals. Do not sell the best, but retain it because the grower hopes to produce equal to it, or improve upon it. It is worth while to keep back double the requirements for seed, run it through the grader, and market the rejected half; then carefully grade the seed again before sowing. Then the seed will be of uniform size, and only the largest of the grain sown.

It is also often stated that two-year-old wheat is preferred to one year. This is hard to understand because, although a grain of wheat is capable of retaining its germinating powers for a long time, still as every year goes by a certain percentage of the grain dies and loses its germinating power. Always regard grain of the preceding harvest as being infinitely superior to older grain, and use no other for seed purposes There is every advantage in grading seed by eliminating small, shrivelled, and broken grain. Broken grain may be useless; it may contain no germ or, if the germ be attached to it, it will not be able to supply the young plant with all that is needed for the early stages of its development. On the other hand, the elimination of the small and shrivelled grain is also an advantage, because:—

1. The germinating power of the large seed is invariably greater than that of the small seed of the same variety.
2. Under similar conditions the large seed invariably gives rise to higher yields both of grain and straw than small seeds.
3. The percentage of large grain in wheat raised from large seed is always greater than when small seed is used.
4. The weight per bushel of wheat grown exclusively from large seed is invariably greater than that of wheat raised from small seed.

The effect of grading and sowing only the large seed is to ensure a more perfect and regular germination; hardier, healthier, and more evenly-developed plants; heavier yields both of grain and straw, and a heavier sample of wheat.

There is a strong opinion with some farmers that wheat grown on the same land tends to degenerate, and that it is a good policy to obtain seed from another district or neighbouring farm. It is probable in some cases that the degeneration

is due to neglect of selection and the manner in which the seed has been handled, by getting it mixed with other varieties through not cleaning out machinery when going on to another variety. However, if a change of seed is needed choose it from a cooler district if possible, as it matures earlier the first year.

The quantity of seed per acre varies considerably in some cases, and the question is governed by a number of factors:—

1. The climate of the district, because a wet district needs thicker sowing than a dry district.

2. It may depend on what the crop is required for; a hay crop needs to be sown much thicker than a grain crop.

3. It will vary with the character of the wheat; free stooling wheat can be sown 10lbs. or more less than those which do not stool so freely.

4. Late seeding needs much thicker sowing than early.

5. If a growth of weeds is anticipated sow thicker.

6. If the land is in good condition with a compact seedbed to ensure good germination sow thinner. Seventy pounds to 80lbs. appears to be a suitable dressing for this district; 90lbs. if land is dirty; 90lbs. to 100lbs. for a hay crop, as a thick crop of hay usually produces hay of better quality.

New land need not be dressed with the amounts mentioned; 50lbs. of graded seed is sufficient for new land, and it needs to be sown early.

Much credit is due to the inventor of the separator which is embodied in the present-day grader. It has been the means of practically getting rid of the objectionable Cape Barley in seed wheat.

BETTER WHEAT-MARKETING METHODS.

[E. A. Pfeiffer, Cummins.]

When a survey is made of the methods under which some of our secondary productions are marketed overseas, such as the trade in barley, butter, eggs, frozen meat, and other commodities, one cannot fail to realise the decided advantage of the schemes under which these commodities are traded.

Take, for example, the butter trade, in which a system of grades is in operation, and under which countries such as Denmark have established a wonderful reputation for their products. Butter being one of the chief exportable commodities of that country, Denmark has striven, not only to obtain a certain standard, but the highest degree of quality that it is possible to obtain, with the consequent result of its enviable reputation. If, therefore, other countries who aim at the highest quality of their chief exportable products can obtain such pleasing results, it is undoubtedly also possible that we in Australia can achieve similar results with similar marketing methods. It is only necessary to investigate the position of the wheat industry of the world in general, and of Australia in particular, to see the deplorable conditions with which this, one of our chief exportable commodities, is faced. Let us therefore ask ourselves what is the best means whereby this most valuable industry can be re-organised, and again made profitable?

From time to time various schemes have been put before the wheatgrowers, but have had the disadvantage of requiring some boosting, which naturally means that revenue from other sources has to be utilised to bring such schemes into operation. While wheatgrowers would momentarily benefit by such schemes, they would ultimately have to forfeit such benefits by being burdened with increased taxation.

The present marketing method of our wheat is carried out on a f.a.q. basis, a standard to which the wheatgrower is required to come up to if he wishes to receive the ruling market price for his product. This standard of quality does not induce the grower to produce wheat above a certain standard, consequently the enthusiastic grower who could produce a superior quality wheat to that which is classed as f.a.q. does not do so because he has the knowledge that he would not receive any more than the ruling market price for such wheat.

[*Papers Read at Conferences.*]

THE ADVANTAGES OF SELLING BY GRADES.

If, however, a system of grading were brought into operation whereby a grower's wheat could be classed into, say, three or four different grades, with a distinct price for each grade, wheatgrowers could be induced to produce the highest possible quality of wheat in the world, which would have a very beneficial effect to our country. Just as the Danish butter is preferred to any other in the world by overseas buyers because of its outstanding qualities, just so would Australian wheat be preferred by overseas millers. If, therefore, all wheat produced by Australia was of the highest possible quality, then such wheat would be preferred to wheat of other countries, and millers would naturally be prepared to pay a better price. If the overseas millers paid more, then overseas buyers would also be in a position to give a better price when they bought the wheat from the Australian merchants, who in turn would be able to pay the grower more for his products.

The natural result would be that wheat growing would once again become profitable. These grades would be determined by the milling quality of the grain itself, freedom from foreign matter such as smut and other diseases, and absence of weed seeds which have a tendency to leave tainted flavours when the wheat is milled.

The varieties of wheat grown under this scheme would play the most important part, for millers decidedly prefer those varieties which contain the highest percentage of gluten, for this content is very essential from a baker's point of view. Only a very limited quantity of low gluten content wheat is actually required. Perhaps the only use to which this class of wheat can be put to advantage is in the manufacture of biscuits, where a flour is required which does not "rise" to any appreciable extent.

Canada, America, and Argentine, on account of atmospheric conditions peculiar to those countries, can produce wheat with a remarkably high gluten content. Consequently if Australians do not make an effort to produce wheat of high gluten content then we are faced with the danger of having to lose otherwise favourable trade conditions. Types of wheat such as Pusa are excellent milling wheats, both on account of the hardness of grain and high gluten content, and would, therefore, under a system of graded marketing, be ranked among the highest grade of wheat. Naturally such wheat would also receive the highest price. If then, a farmer exclusively grew these types, and concentrated to produce the highest quality grain, free from diseases and taints, such a farmer would be the one who would receive the greatest income from his labours. However, if some farmers were to continue to grow types of wheat which were not very suitable for milling such as Free Gallipoli then they would, unless good market prices existed, not receive sufficient reward for their labours, for such types would be classed as a much lower grade, and would, therefore, receive a decidedly lower market price.

There are doubtless some farmers who would view this with prejudice, for they hold that wheats such as these yield better, grow denser straw, will not lodge or shake, and have other advantages from a grower's point of view. But that is where an advantage of this scheme would come in, for the fact that wheats of the best milling type are as a rule not good yielders, would have to some extent the effect of reducing over production. The only means of encouragement to farmers to grow good quality wheat to-day is offered by the Royal Agricultural Society and country shows. But apart from the wheat exhibited it does not require the farmer who is enthusiastic enough to display such exhibits to produce all his wheat of that quality. Then there are the Crop Competitions conducted in various parts of our wheatgrowing communities. It cannot be contradicted that schemes such as these are invaluable to progressive wheatgrowers. Undoubtedly the aims of these schemes and those of a system of graded marketing are identical for they all aim at better quality.

The only difference between these schemes is, while Crop Competitions, Show Exhibits, &c., are only beneficially effective to a section of the community, a system of graded marketing would be of national advantage. Barley has been marketed under this method, and has been found highly satisfactory. This system has helped barley to maintain a fair price while wheat prices slumped. The writer does not here wish to infer that had this scheme been in operation prices would not have slumped, but it is reasonable to assume that better prices would have ruled had such methods of marketing been in operation.

The fact that quite a number of wheats grown in Australia are of poor milling quality is beyond argument. And unless some scheme is brought into existence whereby buyers can rely on Australian wheat being superior and consistent in quality our reputation as a wheatgrowing country will vanish. It is, then, possible that Australian wheat will be branded as "inferior," and cause the world's wheat buyers to turn towards other markets.

STABILIZING THE WHEAT INDUSTRY.

[G. A. Vigar, Mount Hope.]

The most urgent question before the Australian public to-day is the rehabilitation of the wheatgrower. It is one of the three leading occupations of rural Australia—wheat, wool, and cattle raising. Probably it gives more employment than any other industry, for it is far-reaching in its effect. Every secondary industry reflects almost immediately the financial position of the wheatgrower; if the wheatgrower is prosperous a market is immediately provided, and probably the best market for all the secondary industries.

[*Papers Read at Conferences.*]

The Commonwealth Government to-day is endeavouring to make arrangements to insure the wheatgrower getting a better return for his labour next harvest, and it is one of the functions of this Conference to advise the Commonwealth Government the best plan to adopt. The plan I suggest is an Australian price for all wheat and flour of 4s. per bushel, and a bounty sufficient to bring a return of 3s. 4d. to the grower at all sidings and outports where wheat is shipped overseas.

Also the erection of grading plants at all deep-sea ports, so that only first-grade sample wheat be shipped overseas, the second grade wheat being sold as such for poultry and cattle feed. The erection of the above grading works would give employment to many men when unemployment is greatest, and at the same time secure a better price for all wheat shipped overseas The wheat-grower must adopt the same principles as the fruitgrower, and only send the best out to the world markets. The question of financing the above scheme would not be difficult, judging by the buoyancy of the Commonwealth revenue through good prices for wool, the buying power of prosperous farmers would provide sufficient revenue (in a country taxed as high as we are in Australia) to cover the tax to pay the bounty on all wheat sold overseas. The operation of the above scheme could be carried out by the present wheat buyers acting under a board of control appointed by the Federal Government, and the scheme would only last until world prices rose in order not to need any Government assistance.

The wheatgrower has every right to ask the rest of the community to come to his assistance while wheat prices are low, as the policy of Australia is a highly protective one, and the wheatgrower up to date has been penalised by it.

SOME ASPECTS OF MORTALITY AMONG SHEEP FROM EATING STINKWORT.

[M. T. Gardner, Koppio.]

Although it is said to be 70 years ago since stinkwort first made its appearance in South Australia in the Onkaparinga district, it is only 30 years ago that the writer first came to have any experience in mortality among sheep from the effects of eating stinkwort. Just prior to finding sheep dead in paddocks in numbers to suggest unnatural deaths, several sheep died in a neighbour's paddock which were considerd to be due to the effects of eating freely of well-grown gum shoots around trees which had been rung previously, and the same results can happen (deaths) in stinkworth infested paddocks if sheep are turned in in the right stages to affect them. Uninitiated sheep owners who have had no experience with stinkwort can easily be trapped by a mistake in this direction, and find to their sorrow in a very little while they have suddenly acquired experience of a very costly nature without any warning or chance to recoup the losses sustained.

Those who have had the experience of losing valuable sheep in varied numbers often thought they were taking precautions to ensure a supply of feed in autumn and saved a stubble paddock for sheep—perhaps for ewes lambing early—and up grew the stinkwort in the dry stubble. Towards the end of April or early in May the sheep were turned on to the paddock, and at the time of the year when dewy nights and misty mornings are frequent the sheep were found dead. It was from such experiences that information concerning stinkwort mortality was obtained, and now by taking precautions sheep can be successfully kept on stinkwort country without losses occurring.

How Stinkwort Affects Sheep.

Usually stinkwort grows better on cultivated land, and sheep usually graze on land which has been most liberally treated with phosphatic fertilisers. Toward the middle of autumn the stinkwort comes to the end of the growing period which

is the setting of seed pods, and this occurs with the period of the year when the best of the summer fodder is about cleaned up and most greenfeed gone. Then, often sheep are grazing on pastures of poor nutritive value, and consequently eat a lot of fibrous material of rather an indigestible nature which by passing through the stomach causes irritation of the intestinal organs. This may go on for a fortnight or three weeks without the owner noticing much amiss with the sheep except that a few show signs of scouring and are not thriving. Others have a brownish, slimy discharge, and when the seed pods are taken into the stomach with dew or mist dead sheep are noticed lying about. After one has had experience with sheep affected with stinkwort it is possible to detect odd sheep which will die later when being moved or driven, the same refusing to travel and looking thin and hollow. These are often sheep that have been kept out of stinkwort paddocks and then allowed to graze where this weed is growing, and if it so happens that the seed pods have dried to the fatal stage—when the seed pod has lost its yellow flower and the end of the pod has turned brown, with the pod just openings and the seed spikelets inside being in a state of rigidness, and with a dewy night or misty morning—then mortality often occurs in large numbers in a single night. There appears to be some action like the piercing of the intestines by the seed spikelets which sets up an irritant poison and causes the death of the sheep feeding on the stinkwort seed. The water in dew or mist seems to accentuate death after the seed pods have beeen consumed, at a certain stage of dryness. We know what action water has on drying seeds of the geranium plant and the wild oat, and possibly the moisture causes some mechanical gyrations of the stinkwort seeds in a similar manner.

How to Avoid Deaths and still keep on Stinkwort-affected Holdings.

This may be a more important phase of the subject than how sheep are affected, and it requires some care on the part of the flockmaster where all fields are covered with stinkwort or some in every paddock. It cannot be all eaten down at once in the early stages. When eaten with the good stubble feed sheep get a lot of feed off it when it is young. If one had enough sheep to do this all the other feed would soon be gone, too. Where sheep are kept on stinkwort they eat most of it before the seeds form, and there is not enough left to do them any harm, but it is while the grazing is going on on that portion that the trouble is storing up in other fields, and it is those fields that have water and are reasonably easy of access that one must graze out sufficiently for the sheep to live in without fear of loss, whilst the other fields are shut up waiting for the danger to pass, which is usually about a month's duration. This year I shifted sheep on April 20th and replaced them in the stinkwort field on May 23rd without any loss.

If the food in the grazed area is short, some provision must be made to replace same. It is no use saving sheep from stinkwort to let them starve to death or to weakness unable to resist death from the rigours of winter. A variety of ways can be used to feed sheep during isolation. Oats or barley can be tipped out on the ground, provided there is roughage enough left in the paddock, at the rate of ½lb. per sheep per day, or chaff fed in self-feeders at the rate of 1lb. per sheep per day, but this entails a lot of labour to feed a large flock.

Pregnant ewes must be fed sufficiently to keep them strong and in good condition to rear lambs. Another way to provide fodder is to have some paddocks of lucerne, which has been proved will grow well on Lower Eyre's Peninsula. This is best planted in spring on well-prepared land. This fodder grows well in early winter, and in a season like the present would be several inches high by the end of April.

For those keeping sheep on Lower Eyre's Peninsula it appears to be necessary to provide dry feed for young sheep during April and May, and if this were the practice the stinkwort menace should not trouble us much so far as the young

sheep are concerned. The strong, dry sheep could fare more hardily than any others, and ewes would be the only extra to be fed provided some run without stinkwort was available for the dry sheep.

Sheep would be grazed away from such fields where danger of mortality abounded, and the feeding would have a three-fold advantage—saving the sheep, cutting more wool, and saving the feed when the danger period was over. Better lambs would also result, and those aiming at fat lamb production would benefit.

The dry feed fed during isolation from danger would not be wasted, as the remainder of paddock feed would be saved; this in turn would provide more feed during winter, and better nourished sheep cutting more wool would be the result.

CARE OF FARM MACHINERY.

[W. E. Bryant, Cummins.]

A very considerable amount of the cost of production of farm products can be reduced by taking reasonable care of implements, machinery, and plant required on the average farm. Unfortunately we often see costly implements put under trees for fowls to roost on, or left out in the paddock or in the open yards, exposed to all weathers, which very quickly reduces their value and usefulness, and also increases the cost of their upkeep. Much of this could be avoided with very little expense by making use of the material close to hand and providing covering for them.

We probably all like stone sheds with iron roofs, or failing that iron sheds, with or without iron sides, as finance permits. Unfortunately the cost of either of the above type of sheds is very often beyond the farmer's means. A very cheap and effective shed can be made from straw and bush timber, which is usually available at a low cost. A shed 60ft. long by 30ft. wide can be erected with 18 forks, or failing all forks, use half forks and the balance straight poles. Twelve forks or poles 10ft. 6in. to 11ft. long would be required for the sides, six on each side. The other six for the centre should be at least 6ft. longer to give the roof a good slope or fall; if they can be secured longer they will be much better. All uprights should be placed at least 2ft. 6in. in the ground.

After placing the wall-plates and ridge-poles in position, place the rafters on them about 4ft. apart; have rafters long enough to go over the bottom wall-plates at least 3ft. (rafters should 19ft. to 20ft. long). I suggest boring a ½in. hole through the small end of all rafters, and tie each rafter to the one on the opposite side of the shed with double fencing wire. This prevents them slipping down. When tying rafters to the bottom wall-plates do not bore them. The battens should be placed about 2ft. apart, and either tied or nailed down to the rafters. This, if covered with broom brush and straight straw, makes a cool and fairly waterproof roof.

The straw should be cut and tied with a binder; use straw that has been stripped if available; it is much better than straw that has been cut by headers or reaper-threshers. The straw should be thoroughly soaked with water and then placed on the shed as wet as possible; this makes the straw pack together very closely. All sheaves should have the bands cut and removed. Start covering from the bottom the same as for thatching. The bottom row of straw should be tied to the lowest batten with string of twine—hay bands will do. Place all the other straw straight and carefully on the roof about 6in. thick As the roof is completed, tie 10-gauge fencing wire to the rafter at one end, and hang a weight on the other end of the wire; this keeps the wires tight at all times, as expansion or contraction does not affect it. Allowing the roof to go 3ft. or more over the side of the shed gives good shelter without side walls.

In this type of shed all implements and machines or vehicles must be taken in and out at the ends, but this is not difficult where one has horses or a tractor. By using a little discretion when putting implements in the shed much time and inconvenience can be saved when the different implements are required. I suggest putting the waggons, drays, lorries, or similar vehicles in one side of the shed, and the harvesters, binders, combines, &c., that should be under cover on the opposite side. While the risk of loss from fire in this class of shed is greater than where stone or iron sheds are used, it is much less than the loss incurred from depreciation in both efficiency and value when implements, &c., are left out exposed to the weather, and the latter loss is very certain.

Another considerable saving can be effected by keeping all bolts, nuts, and screws tight, and when replacing worn or broken bolts using one of the correct size. When putting implements away it is a good practice to clean all oil, dirt, and grease from them. This can be done very easily while it is soft, but if left on until it becomes hard and dry it is far more difficult to remove, and takes more time to do and is an unsatisfactory job when it is finished. When cleaning the implements, a note should be made of all badly worn or broken parts, and these should be replaced before the implement is required for use again, and not left until the last minute to do so.

TOMATO GROWING IN THE OPEN FOR CUMMINS AND YEELANNA DISTRICT.

[R. GRANIT, Cummins.]

The tomato ripens at the time of year when the farmer is compelled to work long hours in excessive heat, and there is hardly any other dish which is looked for with greater desire than is the tomato when due to the heat hot meals have to be replaced by cold meals consisting partly of fruit of some kind. Not only does the tomato provide a desired food at the time of ripening, but the housewife may store supplies for later date by preparing some of the tomatoes for sauce, pickles, jam, &c., and besides providing the desired food, it also gives to the housewife that personal satisfaction which is accompanied with all home industry. The object of this paper is to induce every farmer to grow sufficient for his own requirements. The following method which is recommended for the above districts may also be adopted in other districts where the soil and climatic conditions are similar.

Preparation of the Land.—It naturally follows that a quick-maturing plant such as the tomato should always be planted in ground which has been prepared some considerable time prior to planting, so that the required plant foods are available as soon as the seedlings are planted out. The land should be turned over three months or more before planting, and kept free from weeds.

Plant Foods.—The writer's observations have proved that most growers dig farmyard manure into the ground at the time of planting out the seedlings. Owing to the time required for the rotting process, and until it has become available plant food, best results are not obtained from such practice, and the writer recommends a liberal dressing of superphosphate at the time of first turning the ground, as it will then be readily available for the seedlings when planted. Should burned lime be available a dressing of same would prove beneficial.

Seedlings.—Due to the sensitiveness of the tomato plant to extreme conditions, and to gain satisfactory results, all check to the plants should be safeguarded, and

this can best be done by rearing the seedlings on the farm. The usual practice of placing fresh stable manure into the bottom of the seed box, although assuring a good germination of the seed, should not be practised for the following reasons:—To avoid any severe check to the plants the seedlings should be hardened as soon as possible, and the writer starts the hardening from the two-leaf stage by removing the glass from the seed boxes during the day, but owing to the strong westerly and south-westerly winds experienced during spring it is often necessary to keep the glass on the box for several days without removing same. Should the bottom of the box be packed with manure it would provide excessive heat during those days when the seed boxes remain covered, with the result that the seedlings become soft, and when opened will receive a check with undesirable results. Where a watered, heated seed box is available it would be an advantage.

The seed should be sown in boxes during the early part of August, and the seedlings are then ready by the end of September, when the reappearance of frost is unlikely. The seedlings should be planted in rows east and west, 2ft. 6in. apart and 3ft. between plants, and protected from wind for some days after planting.

Pruning and Training.—The plants should be pruned by removing any side shoots that are sprouting, and the writer has had best results by pruning the plant to one single stem in its early life, and later allowing one or more to appear. In many instances growers are in the habit of driving one or more stakes into the ground, and then allowing the plants to climb the stakes vertically. The best results cannot be had from the above practice because:—(1) The vertical flow of sap retards the fruit-bearing habit of the plant, and (2) the plants are subject to the strong winds which often destroy the flowers.

To encourage the fruit-bearing habit of the tomato plant its growth should be trained horizontally as soon as possible, and it is usually done by having a trellis erected, but as the trellis requires material and labour, especially when it should be removed annually to fresh ground, very few go to the trouble of having a trellis erected.

A number of years ago the writer experimented with the following method of training the plants, which proved such a success that he is confident in recommending same to others The method is as follows:—By cutting No. 10 galvanized fencing wire into lengths of 15in. and bending 3in. of one end to a loop. As soon as the plant has reached the height of 8in. the wire is pushed into the ground with the loop over the plant, forcing the plant to bend over. The plant should be trained towards the east because (1) of its natural tendency to go towards the morning sun; (2) because of the prevailing westerly winds in spring the training will be easier if directed towards the east.

As soon as the plants have made further growth the wire should be pulled out and placed further on the plant to keep same growing horizontally, also having a steadying effect on the plant. This must be repeated constantly during the growing periods. At the end of the season the wires should be collected and stored for the next year.

Watering.—The district having a clay subsoil, care should also be used in waterin the plants, as excessive watering is applied in most cases. Of course the weather is always a big factor, and should be taken into consideration, but during summer when no rain has fallen a good watering once in every 10 or 14 days will give the best results.

Disease Control.—Remove all affected fruit from the growing area and thereby prevent undesirable spores from entering the earth.

[*Papers Read at Conferences.*]

SIDELINES ON THE FARM.

[MESSRS. LAWRIE BROS., Ungarra.]

Mixed farming under present conditions appears to be essential on this part of the Coast. Neither wheat, wool, dairying, pig raising, or poultry, &c., when conducted only as a farm for any one of these products, seems to produce the necessary income to cover the expenses of production and provide a reasonable living for the farmer. Marketing conditions do not appear to be suitable for poultry raising as the sole source of income, but when conducted in conjunction with other lines it is quite a different matter. Considering these sidelines under separate headings I will enumerate some of the methods which we have more or less successfully adopted:—

Wheat.—We have cropped fair acreages, and the yield has been up to average, but the price too low to make the sale of all the wheat as such profitable, so we decided to divert part of the good and all the inferior wheat to more profitable use. To do this we considered pig and poultry raising.

Wool.—Prior to last season the previous years' prices have not been high, and we only handle small flocks of sheep. The work entailed in handling fills in the slack part of the year, and produces a substantial cheque and also the ration sheep.

Dairying.—This is one of the best of the sidelines, as it produces an income throughout the whole year. Dividing it into sections, the first consideration is:—

(*a*) *Pasture.*—We recommend dividing the paddocks into the smallest practical area, because cows relish a change of paddock, and with small paddocks frequent changes are possible.

(*b*) *Grass.*—Natural green grass contains most of the elements necessary to produce health and milk fats from the cattle. The Dairy Council have provided seed and super for experimental plots on our property of Wimmera rye grass, Subterranean clover, and lucerne. Rye grass is very forward, and the stock are doing well on it. Lucerne and Subterranean clover should provide good summer greenfeed, and it is our intention to fence off a portion of the lucerne, and irrigate it in summer.

We have been advised that lucerne, if given to the cows either fresh or cut, or by allowing them to graze on the growing crop, is likely to give the milk a rank flavour and also to do harm to the cows; the better was is to cut the lucerne and allow it to stand for at least eight hours before feeding.

The natural grasses on the farm are barley grass and silver and spear grass, and these are only good for a couple of months, drying off at the first signs of summer, consequently it is vitally necessary to supplement them with more lasting species.

Top Dressing.—We have adopted this in a small way, and results prove that further extensions are advisable. Last season we used 45 per cent. super and about 120lbs. to the acre, the land which has been topped dressed showing much better and more lasting growth than the ordinary paddocks.

Breed.—The climate and class of country bears a big influence on the breed of cattle to be selected for the farm. The climate in these districts is not severe, and is very suitable for the Jersey. The breed to be selected is a matter for long experience of local conditions, and we consider that it is advisable when starting out, for a farmer to take the advice of those who have been successful in the particular district to be operated in, or better still the experts provided for that purpose by the Government.

It is not always possible for a farmer to start off with a good herd of high-class cattle, but it is within his power to gradually improve his herd. It is essential that the bull come from a proved milk fat producing strain. Butter factories have provided the means for a farmer to test his cows, and by having the cows tested monthly the production for the whole period of the lactation can be known.

By fattening those cows whose production is less than 250lbs. of butterfat for the year and selling to the butchers, a farmer in a few years can, by breeding only from those animals who have proved their value, soon have a herd which are money producers and not simply work producing cattle.

Housing.—A cow produces milk from the surplus value of the food she eats beyond what is required for her own existence. If no shelter is provided, it necessarily follows that the colder the animal is the more of the food is used to generate her own warmth. A few good trees in the paddock or better still a fair-sized straw stack provide protection from the elements which help milk production.

The milking sheds should be clean and on raised ground, the floor well drained and, if possible, of concrete. Stalls should be provided, and each cow regularly milked in the same stall and in the same order. The manure heap to be some distance from the milk yards. The separator room should be detached from the shed and on the opposite side of the shed to that from which the usual winds blow. We have found a decided reduction in the work of the house by having a roofed passage way between the cow sheds and the separator room, and in this the cleansing of the utensils is done.

Feed.—As previously pointed out green grass is the finest food cattle can have, but the cows are more contented at milking time if fed on a little dry chaff with crushed oats added. In cold weather and during the period of dry feed we give the cows an addition to the chaff of crushed oats and a little bran and linseed meal, but consider that the crushed oats show much better results in our cream cheque than the bran.

Milking.—Regularity of time of milking is very important, and so far as possible have the same person milking the same cow each day Contentment of the cow has a big influence on her production, and the cows get used to a person and seem to give better results if the same person always milks them.

Pigs.—This sideline has its importance in the profitable use of pinched grain and skim milk, and by raising pigs we receive almost as much value from the skim milk as we do from the butterfat.

Housing.—We have provided sties of stone, roofed with thatch and intend flooring with concrete and bedding with straw, for farrowing and topping off for market. The growing pigs and weaners we are running in small green feed paddocks.

Breed.—Acting on recommendations from the bacon factory we are using Large White boars and Tamworth-Berkshire sows and averaging five litters in two years.

Feed.—Before farrowing, we feed the dry sows on soaked oats. After farrowing the sow receives pollard, crushed wheat and crushed barley mixed with skim milk and cut green feed, placing a portion of the same food in a dish outside the sty, but accessible to the young pigs through a space below the bottom rail of the sty. Weaners have similar foods and when topping up for market the pigs are fed on all dry foods, crushed wheat and barley and meat meal, with the addition of clean skim milk. It is our endeavour to have the pigs fit for curing within five months of farrowing. Clean sties produce healthy pigs.

Poultry.—The export trade has not been of any benefit to the Coast as yet, because merchants state they cannot receive sufficient quantities of the class of egg required to make the cost of testing under export conditions profitable owing to the methods of transport fracturing the air cells. With conditions as they exist, we have to make the best use of the facilities available, and so have concentrated on raising birds capable of producing the most eggs and also birds for show purposes. White Leghorn and Black Orpington have proved the best breeds for laying, and we do not favour cross breeding with poultry. The sidelines on our farm have borne results quite the equal of any other branch of our operations, and that, even with the low prices available, when properly conducted, a farm can be successfully run to-day when the true methods of mixed farming are adopted.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on September 26th, 1934, there being present Messrs. A. J. Cooke (Chairman), A. M. Dawkins, J. W. Sandford, F. Coleman, H. N. Wicks, A. J. A. Koch, and H. C. Pritchard (Secretary). Apologies were received from Messrs. P. J. Baily, G. Jeffrey, Professor A. J. Perkins, and Dr. A. E. V. Richardson.

Congress.—The Secretary reported that arrangements were well in hand for this year's Congress.

New Branches.—Approval was given for the formation of Women's Branches at Wirrabara, Sheoak Log, Monarto South, and Wilmington, with the following Foundation Members:—*Wirrabara*: Mesdames N. Keynes, L. C. Menz, H. J. Watt, G. and C. Kranz, C. Cooper, H. Banfield, E. and H. Curtis, E. Frances, W. Noblet, B. Holland, J. Porter, and Miss J. Menz. *Sheoak Log*: Mesdames M. Eden, A. Noll, D. Hienjus, H. and E. Dahlitz, G. Bamman, A. Sissman, D. Everett, V. Bowden, M. Geue, H. Koch, T. Mitchell, E. Tremlett, E. Lienert, H. Argent, Misses E. and H. Tremlett, K. and H. Koch, F. Kuhlmann, D. Matthews, M. Everett, C. and E. Sissman, J. Argent, Z. and K. Bamman, V. Dahlitz, L. Noll, B. and D. Eden. *Monarto South*: Mesdames H. B. and C. White, C. F. Altmann, F. Liebelt, E. Hartman, E. Schnoars, T. Bretag, V. McAdam, Misses G. Strauss, M. Hartmann, F. Aesche, E. Hein, V. Baum, J. Cottrell, and S. Schenscher. *Wilmington*: Mesdames S. Genders, H. Stevens, M. Christophersen, J. Drennan, M., P., and J. Modystach, J., A., and J. Hampel, G. Stoney, P. Cole, Haase, A. Pitt, H. Duhring, Bury, Pengelly, McGhee, L. Wright, Davidson, Misses M., F., A., E., K., and T. Modystach.

Life Members.—Life Membership of the Agricultural Bureau was conferred upon Messrs. J. G. Pearce (Milang), E. H. Schulze (Taplan), and H. Jacobs (Cherry Gardens).

New Members.—The following New Members were approved:—Hope Forest and Dingabledinga Women's—Miss E. DeCaux, Mrs. R. Wade, Mrs. L. DeCaux; Butler—A. and H. Parker; Caliph—J. W. Burnett; Wirrilla Women's—Mrs. T. Jacka; Laura Bay Women's—Mrs. A. H. Barnett, Miss D. Blumson; Pygery Women's—Mrs. M. and Miss M. Kammerman, Mrs. C. Gosling; Truro—Jas. Miller; Watervale—Mr. J. W. Baillie; Truro—Rev. W. Catterall; Sutherlands—W. Doecke; Echunga—C. J. B. Symon, E. T. Oinn, P. T. Duffield, A. W. Cobbledick, C. Witcke, W. G. Colebatch, E. A. Liebelt; Snowtown—J. F. Kelly, M. Freebairn; Wilmington Women's—Mrs. - Brown, Mrs. - Clark, Mrs. H. Noll; Wilmington, L. W. Harvey; Mount Gambier—John Livingstone; Penola Women's—Mrs. R. H. Ricketts, Mrs. A. Balnaves, Mrs. E. P. Walsh, Mrs. C. Rickard, Miss G. McWaters, Miss J. Neilson, Mrs. R. McDonald; Belalie Women's—Mrs. P. W. Frost, Mrs. J. Pilkington, Mrs. W. Glasson; Moorlands—A. R. Payne; Dudley—E. Possingham, E. Jamieson; Arthurton—R. W., A., and H. Burns, P. and L. G. Ford, J. R. and R. Fergusson, P. G. Kitto; Rosedale—M. Eve; Blackwood—C. H. Eglinton; Penwortham—W. K. Birks, A. L. Wayman; Hartley—A. A. Hutson, N. J. Cross; Boor's Plains—Frank Reid; Warramboo Women's—Mrs. F. E. Swanson; Inman Valley—W. A. and S. Hacklin, H. Hagger, J. B. Rogers, J. Astbery, T. E. Bear, R. H. Hagger, W. R. Beresford; Wudinna—J. W. L. Shillabeer, W. M. Smith, W. M. Bartley, R. L. Naylor, H. J. Bartley; Roberts and Verran—R. D. Jonas; Pinbong—J. D. Roberts; Goode Women's—Misses T. and I. Paech; Goode—E. M. Goldsmith; Hartley—A. Wundersitz, A. Brook, R. H. Cross, A. E. Jaensch; Light's Pass—A. H. McLay, H. C. Reade, J. A. Craig, J. A. Tscharke; Bute—G. A. Green; Lenswood and Forest Range—J. Martin, A. Cramond; Kalangadoo Women's—Mrs. J.

Rogers; Chilpuddie Rock—R. Redding, F. H. and H. J. Pearce, H. A. Cant, J. W. Parsons; Greenock—C. and H. Werner; Goode Women's—Mrs. R. A. Lange; Warcowie—B. E. and E. G. Telfer; Koolunga—E. Fuller; Marama—D. Rawlings; Parilla Women's—Miss J. Carman, Misses H. and V. Edward, Miss D. Phillis; Coomandook—L. McArdle, R. Williams, K. Wilson, J. Martin, J. Gulley, P. C. and R. Crouch; Auburn Women's—Mrs. S. Stephens, Mrs. B. Burfield, Mrs. D. Garrett, Mrs. Brokenshire, Mrs. Bert Allen; Nunjikompita—C. May, R. Dunn, H. E. Pascoe, J. Dolling, S. B. Lang, B. Salmon; Rendelsham—R. Lane, K. Stuckey; Balaklava—G. Whiting, T. Harvey; Clare Women's—Mrs. F. K. Knappstein, Mrs. J. W. Berryman, Mrs. E. Catford; Ki Ki—W. O. Cooley, H. Goodall, R. Owen, G. E. Wyatt; Palabie—Roy Mullins, T. Silvy; Brownlow—B. Schutz; Morchard Women's—Miss F. Brown; Penola—A. A. Green; Wasleys Women's—Mrs. J. Mullins (senior), Mrs. J. Mullins (junior); Pinnaroo Women's—Mrs. W. Wilson, Mrs. J. E. Hannigan, Mrs. B. I. C. Vianeldo, Miss L. Badman, Miss F. Davis, Misses J. and N. Mattiske, Miss E. Atze; Owen—K. Wilson, A. Freebairn, M. Saint, H. Bradley; Calca—J. Harris; Roseworthy—W. J. Alters, A. J. Riggs, A. Pengilly, J. O'Brien; Milang—R. J. Newland; Taplan Women's—Mrs. S. and Miss D. Grant, Miss E. Hammond, Miss E. Condon, Mrs. G. and Misses D. and K. Schwerdt; Yurgo—W. Skelton, E. W. and E. H. Kriewaldt; Aldinga—C. Bird, S. C. Payne; Wilmington—I. G. Schulz; Currency Creek—W. Langham; Cungena—M. A. Quinn; McLaren Flat Women's—Miss E. Air; Kybybolite—G. J. Webster, W. D. Starick; Pinnaroo Women's—Mrs. E. T. Eichele; Paskeville—J. Tiddy; Mundalla—J. Humphreys, J. Sabey.

Present No. of Members, 7,384; present No. of Branches, 335.

Several items were discussed in Committee.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC. JULY AND AUGUST, 1934.

IMPORTS.

Interstate.

	July.	August.
Apples (bushels)	157	70
Apples, Custard (bushels)	18	5½
Bananas (bushels)	15,894½	14,653½
Citrus—		
Grape Fruit (bushels)	—	3
Lemons (bushel)	—	1
Mixed (bushel)	1	—
Oranges (bushels)	91	168
Passion Fruit (bushels)	287½	291½
Paw Paws (bushels)	48	35
Pineapples (bushels)	1,458	1,525
Tomatoes (bushel)	—	1
Nuts—		
Cocoanuts (bags)	1	2
Peanuts (bags)	272	420
Peanuts, Kernels (bags)	82	109
Popple (bags)	2	—
Ginger (package)	1	—
Beans (bushels)	183	372
Cauliflowers (bags)	2	—
Cucumbers (bushels)	5	—
Mixed Vegetables (bags)	—	30
Onions (bags)	539	567
Potatoes (bags)	27,378	21,406
Potatoes, Sweet (bushels)	30	31

	July.	Aug.
Swedes (bags)	2	1
Bulbs (packages)	55	28
Plants, Ornamental (packages)	64	99
Plants, Vegetable (packages)	—	2
Roots, Vegetable (package)	—	1
Seeds (packages)	69	65
Shrubs (packages)	4	3
Trees, Fruit (packages)	51	52
Trees, Ornamental (packages)	4	2
Wine Casks (No.)	3,291	3,035
Fumigated—		
Plants (packages)	1	1
Trees, Fruit (packages)	28	34
Wine Casks (No.)	2	50
Rejected—		
Apples (bushel)	1	—
Bananas (bushels)	15	12½
Citrus—		
Grape Fruit (bushel)	—	1
Oranges (bushels)	4	—
Pineapples (bushels)	—	3
Second-hand bags (No.)	745	191
Second-hand cases (No.)	1	—

Overseas.

(State Law.)

	July.	August.
Wine casks (No.)	650	660
Fumigated—Wine casks (No.)	68	23

Federal Quarantine Act.

	July.		August.	
	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	4,965	987,208	7,322	1,279,422
Canes	15	—	116	—
Chests, cocoanut	370	—	601	—
Chests, tea	1,899	—	2,179	—
Timber	252,224	10,159,503 Sup. ft.	84,305	430,123 Sup. ft.

EXPORTS.

Federal Commerce Act.

		July. Pkgs.	August. Pkgs.
Africa, South	Peas, split	—	67
	Plants	—	1
	Seeds	—	6
England	Citrus— Oranges	7,316	6,472
Fiji	Other vegetables	11	—
India	Apples	1,267	529
	Citrus— Oranges	270	327
	Pears	35	—
	Other vegetables	98	99
Netherlands, East Indies	Apples	918	220
	Citrus— Oranges	293	162
	Pears	10	—
	Other vegetables	21	29
New Zealand	Citrus— Oranges	—	36,885
	Plants	1	4
	Seeds	—	32
Singapore	Apples	30	—
	Citrus— Lemons	12	12
	Oranges	146	4
	Other vegetables	121	130
Straits Settlements	Apples	10	—
	Citrus— Oranges	20	—
	Potatoes	10	5
	Other vegetables	10	11

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. SANDFORD & CO., LIMITED, reported on October 2nd, 1934.

BUTTER.—Production throughout September increased fairly rapidly as good general rains were received in most parts of the State and the feed came along nicely. Unfortunately, the London market has gone from bad to worse, and although stocks on hand have been somewhat relieved, there were still about three-quarters of a million boxes of New Zealand and Australian butter in cold stores in Great Britain at the end of the month. London values were down to 66s. to 67s. per cwt. for cold stored, and 1s. or 2s. per cwt. higher for fresh landed. Local prices also eased, but with the Voluntary Plan, which was being operated by the manufacturers, the position of the farmers was materially helped. Choicest creamery fresh butter in bulk, 1s. 0¼d. per lb.; prints and delivery extra. (These prices are subject to stabilisation levies.) Store and collectors' lots, 5d to 5½d. per lb. according to quality.

CHEESE.—Manufacturing is in full swing at present in the South-Eastern factories, and a number of them are working almost up to capacity, as the rains in the Mount Gambier district have fallen at the right time and the pastures are better there than in other parts of the State. Exporting of the surplus continues, and local and Western Australian trade was well maintained. Large medium, 8¼d. to 8¾d. per lb.; loaf, 8¾d. to 9¼d. per lb.; semi-matured and matured, 8½d. to 9d. per lb.

EGGS.—Since our last report quantities have increased rapidly and merchants have exported all that would pass the graders. With the local trade and pulp manufacturers putting down quantities for winter use, markets were kept nicely cleared, but, generally speaking, production is lower, although prices are higher in consequence than for the corresponding period last year. Ordinary country eggs, fair average quality, 7¼d. per dozen net; export quality, clean eggs, 1¾ozs. and over, up to 10½d. per dozen net.

BACON.—Ample supplies were marketed throughout the month by the factories, but trade was well maintained, especially for middle cuts and boneless rolls. Hams for current trade were purchased in only limited quantities, but some booking for Christmas hams were recorded. Prices were firmer, and it is expected that higher rates will rule for hams as the Christmas season approaches. Best quality sides, 9¼d. to 9½d. per lb.; middles, 10d. to 10½d.; rolls, 8d. to 8½d.; hams, 11½d. to 1s.; cooked, 1s. 1½d. to 1s. 2d per lb.; lard prints, 5d. per lb.

ALMONDS.—Good clearances were effected from week to week, although the supplies were not very heavy, as many of the growers have ere this fairly reduced stocks. As the date of report the demand seemed likely to continue and sellers are advised to consign. Softshells and Brandis, 9d. to 9¼d. per lb.; hardshells, 5½d. to 6d. per lb.; kernels, 1s. 11d. to 2s. per lb

HONEY.—The quality of the consignments received were, generally speaking, of a high standard, but buyers only purchased sparingly and interstate trade was disappointing. Considerable stocks were carried over at the end of the month, but there was no alteration in quotations. Prime quality clear extracted, 3d. to 3½d. per lb.; lower grades, 2d. to 2½d. per lb.

BEESWAX.—Came forward in fairly good quantities and ready clearances were effected, 1s. 4d. to 1s. 4½d. per lb. according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday and our sale rooms are the best equipped in the State. With the near approach of the visit of the Duke of Gloucester, the advent of the Royal Show in Adelaide this month, and expected influx of visitors to the city, the demand for poultry has been very brisk, especially as buyers were desirous of holding sufficient stocks in cold store to meet the increased trade. The catalogues submitted during the month were lengthy, but competition was keen for prime quality, heavyweight stock. We advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 3s. 6d. to 5s.; nice conditioned cockerels, 3s. to 3s. 5d.; fair conditioned cockerels, 2s. 2d. to 2s. 11d.; chickens, lower; heavyweight hens, 2s. 10d. to 3s. 6d.; medium hens, 2s. 1d. to 2s. 9d.; light hens, 1s. 8d. to 2s.; couple of pens of weedy sorts, lower; prime young muscovy drakes, 4s. to 5s. 3d.; young muscovy ducks, 2s. 3d. to 3s.; ordinary ducks, 1s. 1d. to 2s.; ducklings, lower; geese, 3s 3d. to 4s. 6d.; goslings, lower; turkeys, good to prime condition, 9d. to 10½d. per lb. live weight; turkeys, fair condition, 7d. to 8d. per lb. live weight; turkeys, poor and crooked breasted, lower; pigeons, 4d. to 6½d. each.

POTATOES.—Prime Victorian, 12s. per cwt.

ONIONS.—Brown Spanish, 12s. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of September, 1934, also the average precipitation for September, and the average annual rainfall.

Station.	For Sept. 1934.	Av'ge. for Sept.	Av'ge. Annual Rain-fall.
Far North and Upper North.			
Oodnadatta	0·03	0·30	4·69
Marree	0·12	0·43	5·93
Farina	0·17	0·47	6·48
Copley	0·24	0·65	7·93
Beltana	0·39	0·73	8·53
Blinman	0·72	1·06	11·92
Hookina	0·63	0·99	11·46
Hawker	0·74	1·15	12·31
Wilson	0·85	1·09	11·82
Gordon	0·65	0·98	10·59
Quorn	1·38	1·31	13·29
Port Augusta	0·75	0·93	9·46
Bruce	0·71	0·97	9·95
Hammond	1·16	1·18	11·27
Wilmington	1·68	1·90	17·43
Willowie	1·33	1·44	12·28
Melrose	2·96	2·48	22·94
Booleroo Centre	2·35	1·69	15·23
Port Germein	1·69	1·29	12·55
Wirrabara	2·76	2·18	19·34
Appila	2·16	1·64	14·66
Cradock	0·67	1·03	10·83
Carrieton	1·15	1·19	12·29
Johnburg	0·90	1·09	10·59
Eurelia	1·70	1·32	12·85
Orroroo	2·20	1·26	13·23
Nackara	0·58	1·14	11·18
Black Rock	1·72	1·26	12·43
Oodlawirra	0·60	1·38	11·67
Peterborough	1·44	1·43	13·27
Yongala	1·75	1·59	14·47
North-East.			
Yunta	0·12	0·74	8·54
Waukaringa	0·13	0·66	7·97
Mannahill	0·19	0·60	8·21
Cockburn	0·36	0·61	7·98
Broken Hill, N.S.W.	0·36	0·74	9·57
Lower North.			
Port Pirie	1·69	1·39	13·26
Port Broughton	2·09	1·52	13·92
Bute	2·67	1·63	15·49
Laura	2·83	2·14	17·99
Caltowie	2·68	2·00	16·75
Jamestown	2·80	2·11	17·75
Gladstone	2·51	1·95	16·33
Crystal Brook	2·64	1·74	15·82
Georgetown	2·70	2·16	18·41
Narridy	2·56	1·80	15·88
Redhill	2·54	1·78	16·61
Spalding	2·25	2·45	18·99
Gulnare	2·82	2·29	18·71
Yacka	2·71	1·76	15·40
Koolunga	2·37	1·64	15·43
Snowtown	2·17	1·68	15·71
Lower North—*continued*.			
Brinkworth	2·31	1·89	15·83
Blyth	2·59	1·93	16·80
Clare	3·62	2·85	24·56
Mintaro	3·76	2·95	23·47
Watervale	4·55	3·14	26·91
Auburn	4·85	2·81	24·00
Hoyleton	3·00	1·96	17·35
Balaklava	2·54	1·68	15·49
Port Wakefield	1·98	1·26	12·96
Terowie	1·86	1·49	13·40
Yarcowie	1·38	1·55	13·63
Hallett	2·04	1·93	16·48
Mount Bryan	2·78	2·22	16·81
Kooringa	2·35	2·09	17·92
Farrell's Flat	2·59	2·17	18·68
West of Murray Range			
Manoora	3·99	2·36	18·93
Saddleworth	3·77	2·24	19·61
Marrabel	3·99	2·33	19·94
Riverton	3·72	2·39	20·81
Tarlee	3·50	2·10	18·13
Stockport	3·63	2·02	16·97
Hamley Bridge	2·71	1·91	16·61
Kapunda	2·89	2·22	19·82
Freeling	3·02	2·01	17·88
Greenock	3·34	2·55	21·57
Truro	2·67	2·31	19·95
Stockwell	2·66	2·32	20·17
Nuriootpa	3·58	2·37	20·72
Angaston	3·19	2·60	22·47
Tanunda	3·27	2·51	22·03
Lyndoch	3·69	2·81	23·46
Williamstown	4·37	2·96	27·77
Adelaide Plains.			
Owen	3·01	1·98	14·53
Mallala	2·40	1·84	16·59
Roseworthy	3·13	1·97	17·39
Gawler	2·89	2·02	18·97
Two Wells	2·60	1·57	15·75
Virginia	3·34	1·77	17·18
Smithfield	3·80	2·01	17·65
Salisbury	4·17	1·88	18·59
Adelaide	3·87	2·07	21·15
Glen Osmond	4·34	2·74	26·03
Magill	3·90	2·70	25·60
Mount Lofty Ranges.			
Teatree Gully	4·64	2·98	27·33
Stirling West	7·67	5·09	47·05
Uraidla	6·51	4·87	44·19
Clarendon	5·25	3·46	32·89
Morphett Vale	3·67	2·47	22·68
Noarlunga	3·69	2·24	20·41
Willunga	4·13	2·79	26·03
Aldinga	3·53	2·26	20·28

RAINFALL—*continued.*

Station.	For Sept. 1934.	Av'ge. for Sept.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*			
Myponga	5·10	3·73	29·68
Normanville	3·29	2·17	20·73
Yankalilla	3·62	2·52	22·90
Mount Pleasant	3·57	3·27	27·24
Birdwood	4·71	3·41	29·24
Gumeracha	5·24	3·74	33·44
Millbrook Res.	6·30	4·20	34·82
Tweedvale	6·32	4·20	35·97
Woodside	4·64	3·92	32·30
Ambleside	5·96	4·14	34·90
Nairne	3·96	3·37	28·17
Mount Barker	4·96	3·62	31·97
Echunga	5·76	3·84	33·26
Macclesfield	4·73	3·74	30·44
Meadows	4·13	4·33	36·21
Strathalbyn	3·06	2·22	19·32
Murray Flats and Valley			
Meningie	2·08	2·04	18·42
Milang	2·81	1·54	14·97
Langhorne's Ck.	2·92	1·67	14·90
Wellington	2·61	1·62	14·70
Tailem Bend	2·59	1·89	15·08
Murray Bridge	1·79	1·58	13·64
Callington	2·30	1·82	15·22
Mannum	0·89	1·32	11·53
Palmer	1·96	2·15	15·55
Sedan	1·19	1·37	12·11
Swan Reach	1·17	1·33	10·62
Blanchetown	1·56	1·00	11·03
Eudunda	2·56	1·94	17·18
Sutherlands	1·20	1·25	10·88
Morgan	0·84	1·00	9·21
Waikerie	1·17	1·10	9·70
Overland Corner	0·85	1·13	10·37
Loxton	1·03	1·43	11·65
Berri	0·97	1·27	10·32
Renmark	1·23	1·23	10·49
West of Spencer's Gulf			
Eucla	0·50	0·76	9·98
Nullarbor	0·39	0·57	8·84
Fowler's Bay	0·54	0·90	11·93
Penong	1·01	1·00	12·23
Koonibba	1·03	1·01	12·11
Denial Bay	0·87	0·85	11·52
Ceduna	0·80	0·86	10·16
Smoky Bay	0·60	0·89	10·51
Wirrulla	0·88	1·15	10·50
Streaky Bay	1·42	1·31	14·88
Chandada	1·03	—	—
Minnipa	1·96	1·32	13·87
Kyancutta	1·29	—	—
Talia	0·93	1·67	14·63
Port Elliston	1·44	1·47	16·50
Yeelanna	2·67	1·84	16·02
Cummins	3·08	1·95	17·61
Port Lincoln	2·89	1·97	19·43
Tumby	2·86	1·68	14·14
Ungarra	2·54	2·13	16·87
Carrow	2·07	1·58	13·16

Station.	For Sept. 1934.	Av'ge. for Sept.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—*continued.*			
Arno Bay	2·56	1·51	12·63
Rudall	2·24	1·41	13·12
Cleve	3·19	1·66	14·79
Cowell	1·49	1·18	11·12
Miltalie	1·85	1·49	13·64
Darke's Peak	2·82	1·76	15·23
Kimba	1·30	1·22	11·84
Yorke Peninsula.			
Wallaroo	2·30	1·34	13·99
Kadina	2·69	1·55	15·69
Moonta	2·65	1·41	15·10
Paskeville	2·87	1·58	15·52
Maitland	3·98	2·03	19·97
Ardrossan	2·83	1·49	13·98
Port Victoria	3·15	1·57	15·49
Curramulka	3·61	1·91	17·95
Minlaton	2·88	1·86	17·85
Port Vincent	2·54	1·79	14·50
Brentwood	2·62	1·75	15·58
Stansbury	2·96	1·92	16·84
Warooka	2·93	1·87	17·53
Yorketown	2·85	1·87	16·94
Edithburgh	3·54	1·79	16·40
South and South-East.			
Cape Borda	3·94	2·13	24·86
Kingscote	3·18	1·85	19·16
Penneshaw	2·99	2·14	19·02
Victor Harbour	4·24	2·40	21·42
Port Elliot	3·51	2·23	19·95
Goolwa	3·34	1·95	17·87
Copeville	1·38	1·56	11·57
Meribah	1·18	1·51	11·46
Alawoona	1·04	1·16	10·29
Mindarie	1·34	1·51	12·22
Sandalwood	1·72	1·65	13·73
Karoonda	1·76	1·76	14·48
Pinnaroo	1·16	1·75	14·57
Parilla	1·60	1·83	14·01
Lameroo	1·75	2·09	16·10
Parrakie	2·26	1·88	14·64
Geranium	2·42	2·07	16·53
Peake	2·40	1·98	16·13
Cooke's Plains	2·15	1·84	15·43
Coomandook	1·91	2·04	17·20
Coonalpyn	2·67	1·99	17·53
Tintinara	2·92	2·18	18·73
Keith	2·94	2·23	17·96
Bordertown	2·03	2·22	19·26
Wolseley	2·11	2·24	18·52
Frances	3·19	2·29	20·01
Naracoorte	3·38	2·59	22·63
Penola	4·36	2·80	26·05
Lucindale	4·31	2·50	23·29
Kingston	3·93	2·35	24·37
Robe	3·80	2·20	24·68
Beachport	4·67	2·35	27·07
Millicent	5·43	2·94	29·81
Kalangadoo	5·04	3·51	32·38
Mount Gambier	4·33	3·07	30·55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.	
		Oct.	Nov.
Adelaide	*	—	—
Alawoona	*	—	—
Allandale East	†	19	16
Alma	*	—	—
Appila-Yarrowie	†	5	2
Arthurton	†	—	—
Ashbourne	*	17	14
Auburn Women's	A.M.	26	30
Balaklava	*	28	R
Balhannah	*	—	—
Balhannah Women's	†	—	—
Balumbah	*	—	—
Balumbah Women's	*	3	7
Beetaloo Valley	†	22	19
Belalie Women's	*	2	10
Berri	*	23	21
Belvidere	*	—	—
Blackheath	†	25	22
Black Rock	*	—	—
Black Springs	†	23	30
Blackwood	*	8	12
Blyth	*	26	23
Booborowie	*	22	19
Booleroo Centre	*	19	16
Boolgun	*	—	—
Boor's Plains	410	4	1
Borrika	*	—	—
Bowhill	*	22	19
Brentwood	*	4	1
Brinkley	*	17	7
Brinkworth	*	22	19
Brownlow	†	—	—
Buchanan	†	—	—
Bute	†	18	15
Butler	*	—	—
Caliph	*	2	6
Caralue	*	17	14
Carrow	*	17	21
Ceduna	*	—	—
Charra	*	—	—
Cherry Gardens	†	—	—
Chilpuddie Rock	*	—	—
Clare Women's	†	6	3
Clarendon	†	15	19
Cleve	*	6	3
Collie	*	3	7
Coomandook	†	26	30
Coonawarra	*	25	22
Coonawarra Women's	*	17	21
Cummins	*	12	9
Cungena	*	4	1
Currency Creek	416	22	19
Dudley	†	—	—
Echunga	†	10	14
Elbow Hill	*	18	15
Eudunda	*	1	5
Eurelia	†	13	10
Eurelia Women's	A.M.	3	7
Farrell's Flat	*	26	30
Finnis	†	—	—
Frances	*	—	—
Frayville	†	18	15
Gawler River	*	—	—
Georgetown	*	20	17
Geranium	*	27	24
Gladstone	*	19	16
Gladstone Women's	†	16	20
Glencoe	*	9	13
Goode	*	—	—
Goode Women's	†	—	—
Greenock	*	15	19
Green Patch	†	18	15
Gumeracha	*	22	19
Hanson	*	23	20
Hartley	†	—	—
Hindmarsh Island	*	—	—
Hope Forest	†	1	5
Hope Forest (Wom's)	†	—	—
Hoyleton	*	15	19
Inman Valley	†	18	15
Jamestown	*	17	21
Jervois	*	11	8
Kalangadoo Women's	*	13	10
Kalangadoo	407	13	10
Kalyan	*	17	21
Kangarilla Women's	*	18	15
Kanni	*	—	—
Kapinnie	*	—	—
Kapunda	*	12	9
Karoonda	*	24	21
Keith	*	18	15
Kelly	*	6	3
Ki Ki	*	—	—
Kilkerran	†	18	15
Kongorong	*	22	19
Koolunga	*	—	—
Koonibba	*	18	15
Koonunga	†	—	—
Koppio	*	24	21
Kringin	*	22	19
Kuitpo	*	17	14
Kulkawirra	†	9	13
Kyancutta	*	2	6
Kybybolite	*	23	20
Kybybolite Women's	†	23	20
Lameroo	†	20	17
Langhorne's Creek	*	17	14
Laura	*	20	24
Laura Bay	†	—	—
Laura Bay Women's	†	—	13
Lensw'd & F'st Range	†	—	—
Light's Pass	†	—	—
Lipson	*	20	17
Lone Gum & Monash	416	17	21
Lone Pine	*	22	19
Lowbank	*	17	21
Loxton	*	12	9
Lyndoch	*	23	20
McLaren Flat	†	—	—
McLaren Flat Wm's	†	4	1
Macclesfield	*	18	15
MacGillivray	*	23	20
Mallala	*	15	19
Maltee	*	18	15
Mangalo	413	—	—
Mangalo Women's	*	10	14

INDEX TO BUREAU REPORTS—*continued.*

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat v. Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep v. Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator v. Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

KALANGADOO (Average annual rainfall, 32.30in.).

July, 1934.

SCRUB COUNTRY AND ITS MANAGEMENT.—Read by Mr. J. D. Hunt:—"In purchasing scrub land be careful not to pay too much for it, because if one should wish to sell it at any time there is not the same demand for this class of country as for the better class of land. The following scrub foliage is classified in order of preference for feed value. Swamp grasses and water rushes take first place, then follows Wire Rush, Sheoak Bush, Honeysuckle Bush, and Needle Bush in that order, and these are what one should look for when selecting a scrub block. Herbage which should be avoided: Fern and big Stringy Bark, Bull Honeysuckle, Black Boy, and Yaccas, which are of practically no food value. Look for low flat country with flood water on it in winter, the wetter scrub is the better. Endeavour to find out if all water holes, wells, and bores are permanent, a plentiful supply of water in the scrub is an absolute necessity, because the feed being of a dry nature the sheep need more water and for a longer period than those running on grass land. There are also the improvements to take into consideration—fencing, windmills, &c., the same as on any other property. The next step is to select the right kind of sheep. These should be between 4-tooth and full-mouthed Merino wethers or ewes, providing the ewes are not intended for breeding. Ewes run on scrub and taken off to be mated do not get in lamb readily. The sheep should be in sound healthy condition (not necessarily fat). They should be taken well into the paddock where it has been burnt and to the water. Inspect them every day or so until they have settled down; fresh sheep going into the scrub are likely to make back to where they are put into the paddock and hang there until thirst and starvation drives them out, which is very bad for the sheep and might cause a break in the wool. Burn about a third of each paddock each year. So far as possible, burns should lead out from the water. Should a patch on the east of the water be burnt and there is thick scrub between, wait for a west wind and burn a strip from the water to connect with the burn, and so on in other directions, as the case may be. Burning should always be done after the first rain, this does not scorch the ground so much, thereby injuring the roots of the herbage. The fence should be burnt every time the scrub is burnt, and the fence done up, for this is the only time that one can make a good job of doing up the fence, and if it is missed for a burn or two and then burnt, it is very hard on the wire as well as the posts. Avoid overstocking, if the scrub country is eaten out it takes longer to recover than grass land, because the strength is not in the ground. Change the sheep on to the grass land as often as possible, this balances the rations and helps to keep the sheep in good health." (Secretary, R. Messenger.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Allandale East .	31/8/34	11	Debate	J. Laslett
Allandale East .	21/9/34	10	Discussion	J. Laslett
Tantanoola	1/9/34	18	Discussion	L. J. Osborne
Millicent	13/8/34	8	Paper—A. Sapiatzer	L. Hutchesson
Wolseley	10/9/34	12	Discussion	E. Sharrad
Mundalla	21/9/34	30	Address—W. Opie	A. Ross
Rendelsham	22/9/34	11	"Potatoes," S. Smith	F. Todd, jun.
Mount Gambier	14/9/34	12	Minerals for Stock	G. Gurry

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warcowie	28/8/34	8	Address—J. O. Hatter	A. Crossman
Eurelia	15/9/34	6	Discussion	E. Wall
Wilmington	25/9/34	11	"Finance," S. Genders	C. Cole
Morchard	21/9/34	12	Paper—A. Twigden	E. Tilbrook

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secreta
Yandiah	10/8/34	14	Annual Meeting	O. Borgas
Redhill	28/8/34	8	Discussion	S. Pengilly
Appila	31/8/34	12	Address—C. A. Goddard	E. Wurst
Narridy	30/8/34	24	Address—C. A. Goddard	J. Klingner
Gladstone	13/8/34	25	Address—J. Hewland....	M. Hoare
Murraytown ...	22/9/34	10	"The Agricultural Bureau," F. Borgas	E. Pitman

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

NANTAWARRA (Average annual rainfall, 15in.).

June 21st.—Attendance, 12.

Breeding and Handling of Lambs for Market.—Paper read by Mr. F. Bryant:—"For crossbred lambs I favour the Merino ewe crossed with an English sire. For preference, use a 6-tooth to full-mouth, or even a cast for age ewe. A younger ewe is likely to give more bother when lambing and perhaps mean the loss of several ewes, whereas an old ewe is a good mother, and will not cause much bother in lambing. Young ewes—especially station-bred—are mostly culls, either because of wrinkles or poor quality wool; whereas older ewes are sold to make room for young breeding ewes which are coming on. Their wool will be of good quality and the ewes will be free from wrinkles. Wrinkles around the tail are a harbour for flies. When selecting a line of ewes for crossing, inspect the wool for quality, and select a line of large-framed ewes for preference. At present prices one may as well have sheep of good quality wool, for these ewes will not eat any more than an ordinary class of sheep.

For mating the ewes, I favour the first week of November, and then taking the rams away the first week of February; do not leave the rams in the flock all the year—this is too much on the ewe and she will never be in condition for growing good wool, When the ewes are lambing they require a lot of attention. Do this in the paddocks; avoid yarding them and keep the dogs at home. About three to four weeks after lambing is a very suitable time to tail the lambs. When tailed early, foxes do not seem to trouble them quite so much, the lambs recover quicker, and are not checked in growth. After yarding the sheep allow them to stand for about an hour or so before starting on the tailing; this will allow the lambs to cool down after driving and thus they will not bleed so much. Have a flat rail about 3ft. high and about 6in. wide on which to do the tailing.

Get the catcher to catch the lamb and then, sitting it on his knees, grip it with the hind legs in between the two front legs, holding the hind legs only. Hold the lamb firmly but not heavily, then place it on the rail ready for the tailer. As soon as the operation is finished, the catcher tilts the lamb slightly forward and releases his grip. This allows the lamb to fall forward and he stands on his hind legs. Never keep the lambs on the rail too long; they soon begin to struggle and kick and knock themselves about. In the case of a ram lamb, the marker stands in front of the lamb, then holds the tail with the left hand, and then with the forefinger and thumb of the same hand holds the back and front of the scrotum or purse. Then with the right hand, using the small blade of a penknife, start on the right hand side of the scrotum, with first a downward and then an upward motion, finishing on the left hand side of scrotum. The scrotum is opened by means of a slit allowing the testicles to come through; these are then drawn by the teeth for preference. As soon as this is done, dock the tail with a clean cut; do not pull the skin tight, but push it away, which means that there will be some left to cover the stump and thus assist in healing.

Many people in opening the scrotum cut the top right off. This is not a good practice; for one reason, it means that to heal, the skin has to grow over this opening, whereas in case of the slit, as soon as the lamb is on its feet again the scrotum falls into its natural position, thus the slit is closed and this soon joins together instead of having to grow a new skin over the scrotum. The healing process is much quicker and there is less likelihood of being trouble with flies.

Do the lambs as quickly as possible by having three or four catchers, thus getting them out of the yards instead of having them lying about where there is a possibility of them picking up germs. Open the gates and let them draw out of the yards slowly, holding the lead until every animal is out of the yard. Allow them to "mother up" before taking them away to the paddock, and when once in the paddock, hold them again until they have "mothered up" properly, then allow them to draw away quickly.

There are many ways of lambing; firstly, the knife as described, the pincers, and thirdly, the new way, which is by means of the burdizzo—a bloodless operation. I have tailed on an average about 7,000 lambs for the last 10 years, and have used all methods, but find the knife the best. Go out amongst the lambs as much as possible, seeing that they are free from flies and not wool blind. A common occurrence amongst sheep is pink-eye. This disease, if left to its own course, lasts about 14 days, and is very contagious. A little sugar put into the eye of a sheep is a good cure; it breaks the film over the eye, and once this is broken they soon recover. When handling lambs do not catch them by the wool—this causes a bruise, and it takes a long time for them to recover from this injury. If dogs are used when driving or handling see that they do not rush or ring the sheep, causing them to be knocked about.

Provided feed has been good, lambs should be ready for marketing when 14 to 16 weeks old. Exporters are nearly always operating at our markets, and they favour a lamb weighing between 70lbs. and 80lbs. live weight, equal to 32lbs. to 38lbs. when dressed. When the required weights have been obtained it is a good plan to kill and dress a lamb and see what it is like when killed. Then pick out a line to send away: do not send the best away first, but grade them. Put them into, say, three lines, and from these select and brand a line which may be termed as "feeler." These are mostly comprised from the second and third lines. These you will find catch the eye of a buyer and bring a good price. After killing he sees their condition, and knowing the brand will be on the lookout for another consignment. These, of course, will be better, and thus the bidding improves for your line. From then on select the tops, thus allowing the seconds to improve in condition.

When trucking, remember to keep dogs away, especially in the yards, and do not use sticks for poking them into the trucks. If hard to get started, take one up the ramp and hold it there until the others start, then gradually draw the leader into the truck, thus they will soon run right through the trucks on their own. Avoid shouting and rushing them around; they go much easier if taken quietly. Finally, when trucking, give details of the breeding of the lambs to your trucking agent, so that he may advise his firm at the Abattoirs." (Secretary, S. Herbert.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Stockport	27/8/34	14	Annual Meeting	L. Klaffer
Light's Pass	27/8/34	28	Papers—J. Jacobs and H. Scholz	C. Verrall
Buchanan	31/8/34	8	Discussion	L. Bell
Penwortham	29/8/34	14	Address—E. Deland	A. Jenner
Stanley Flat	3/9/34	18	Address—Mr. Guster	P. Quirke
Frayville	23/8/34	6	Paper—S. Bretag	H. Ramm
Rosedale	27/8/34	36	Address—Mr. Duggan	S. Sincock
Dudley	24/7/34	—	Annual Meeting	D. Telfer
Riverton	29/8/34	—	Cinema Lecture—Vacuum Oil Co.	O. Longbottom
Black Springs	4/9/34	12	Address—C. A. Goddard	K. Dunn
Black Springs	18/9/34	5	Discussion	K. Dunn
Sutherlands	6/9/34	23	"Colt Breaking," G. Kernick	E. Schiller
Snowtown	16/9/34	8	Address—W. C. Johnston	A. Hocking
Truro	17/9/34	15	Field Day	L. Davis
Koonunga	19/9/34	17	Address—W. C. Johnston	H. Mibus
Wasleys	13/9/34	14	Question Box	C. R. Currie
Light's Pass	24/9/34	22	Impromptu Speeches	C. Verrall
Brownlow	21/9/34	23	Debate	A. Steinborner

YORKE PENINSULA DISTRICT.

BOORS PLAINS FIELD DAY.

"With anything like a reasonable finish there will be a lot of wheat come out of these districts this year." Thus did Mr. W. C. Johnston (District Agricultural Instructor) sum up the crops inspected on October 4th, the occasion being the Annual Field Day of the Boors Plains Branch of the Agricultural Bureau. Mr. F. C. Richards (Assistant Secretary Agricultural Bureau) and scholars of the Agricultural Class of the Kadina High School, in charge of Mr. McCarter, together with members of the Boors Plains Branch, first visited the property of Messrs. A. Rodda & Sons, "Churinga," Cunliffe. The holding consists of 2,400 acres, 900 acres of which are in wheat this year, the varieties being chiefly Sword, Waratah, and Gallipoli. Mr. Rodda said: "Sword has proved particularly suitable for this district. In 1931 I bought one bag from Roseworthy College. Since then I have sold 1,800 bags of it as Seed Wheat, and this year have sown it on 340 acres of fallow. It can be sown in any land at any time and will hold its own with any other variety." Other cropping

Boor's Plains Field Day.—Crop Inspection.

activities of this farm include 200 acres of Barley, 150 acres of Oats, and 700 acres of fallow. The Rodda Bros. are enthusiastic Clydesdale horse men, and at the present time have over 60 head of horses on their farm. Their head sire is Fairview Ambition, by Flashdale from Ochertyre Irene (N.Z.), and was bred by Mr. C. S. Rodda, a well-known Clydesdale breeder of Warracknabeal, Victoria. In common with practically every district of the State, paddock feed has been very scarce, and the flock of 300 sheep had to be hand-fed for over two months. Considering the dry weather experienced, crops are looking remarkably well. There is a noticeable freedom from disease, and Mr. Rodda expects a farm average yield of from seven to eight bags of wheat to the acre. To ensure adequate fodder supplies for next year, Rodda Bros. propose cutting 150 acres of crop for hay. A team of boys from the Kadina High School will take part in the Live Stock judging competitions at this year's Show, and Mr. Rodda brought in several of his mares and colts in order to give the boys the opportunity of brushing up their knowledge in readiness for the Show.

Mr. T. Stanway's holding of 1,800 acres was next visited. He has lived in the Boors Plains district all his life, and manages his property as a mixed farming proposition. His cropping programme for this year includes 500 acres of wheat—Sword, Waratah, Ranee, and Ford, the last-mentioned giving the appearance of yielding the best return—80 acres Oats, and 150 acres of Barley.

Perhaps the most noteworthy feature of the day's inspection was the marked attention that is being given to the management of Pigs. Only a few years ago most farms kept a few pigs to eat the waste from the kitchen and provide bacon and ham for the house. Nowadays many farmers are devoting no small amount of time to the care and management of this form of live stock. Speaking to Mr. Stanway about his pigs, he said: "I am running 70 head. I use the Large White boar, mate him to a Berkshire sow, and then bring the sows in that litter back to the Large White boar. This year," he said, "I have had a wonderful run with pigs. Apart from the meat meal, I grow all the feed they consume on the farm. The grain I soak and feed in the proportion of 1 of wheat to 5 of barley. Barley for which last year I was offered 1s. 10d. to 2s. per bushel has returned to me 3s. 3d. to 3s. 6d. when fed through pigs."

Boor's Plains Field Day.—On Messrs. Rodda & Sons' Farm. Mr. Rodda explaining points of a Clydesdale mare to Boys of the Kadina High School.

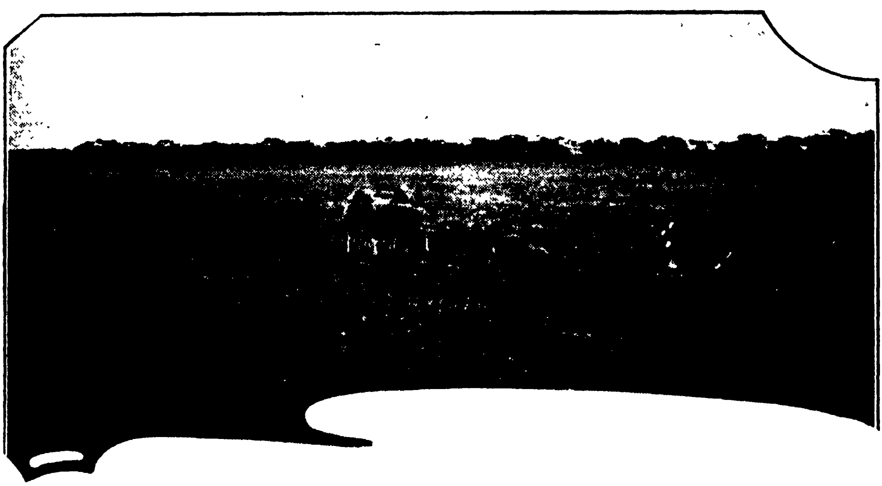
Mr. Stanway attributes most of his success with Pigs to the care he gives the youngsters during the first 10 weeks after they are born. He said: "The last 60 pigs that I have delivered to the Abattoirs have netted me 63s. per head." Mr. Stanway has a nice Jersey herd and is milking 11 cows. The sire is Brinkworth Chris, by Geneva Chris of Penrith. The skim milk from the cows makes a valuable addition to the food supplies for the pigs.

The party then went on to the farm of A. Yelland & Sons. The first crop inspected was 150 acres of Ranee. It was clean and level, and Mr. Johnston, on being asked to make an estimate of its yield, said: "27 bushels if the season does not 'shut up' too quickly."

Altogether there are 700 acres under Ranee, Sword, Waratah, Daphne, and Nabawa wheats. Livestock activities are represented principally by Fat-lamb raising and Poultry, the latter being conducted on a fairly large scale. Mr. Yelland has 300 laying hens—Minorcas and White Leghorns—and has this year raised 600 chicks. So well have his Minorcas laid this year that next year he hopes to enter a pen in the Parafield Egg-laying Competition.

The last property inspected was that of Mr. S. Chynoweth, the capable Secretary of the Boors Plains Branch. A noteworthy feature of the paddocks under crop was the exceptionally wide breaks that had been left as protection against fire. "I am surrounded on all sides by tractor farmers," said Mr. Chynoweth, "and it is better to be sure than sorry." Mr. Chynoweth's holding is a comparatively small one—710 acres of arable land; 50 acres of scrub have been left to provide shade for livestock and firewood supplies—the latter is becoming quite a problem in the district—360 acres are sown with wheat and 150 acres of malting barley. Mr. Chynoweth expressed the opinion that crops generally speaking were up to standard, the best of them being on the stoney rises. He is another farmer who is devoting a good deal of time to Pigs, and is convinced that the right type of Large White boar is the best sire for pigs for both the local and export markets. He normally runs about 100 pigs, and in the last four years his porkers have not been beaten in the Kadina Show. The herd has been built up from boars from Mr. A. J. Aldridge's Gawler River Stud. Mr. Chynoweth keeps a careful record of his activities with pigs. The skim milk and barley are produced on the farm, and barley for which he was offered 1s. 9d. per bushel last year was worth 3s. 10d. per bushel fed through his pigs. The poultry are managed by Mrs. and Miss Chynoweth and 50 dozen eggs are marketed each week.

Other farms visited were those of Messrs. M. D. Wright and L. Northy.



Mr. W. F. Latty's "Hinkler," winner of the Open Sheep Dog Trials, Northern Yorke Peninsula Agricultural Bureaux Field Trial, August 22nd, 1934.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Paskeville	28/8/34	11	Discussion	J. Prouse
Paskeville	10/9/34	—	Address—C. A. Goddard	J. Prouse
Kilkerran	28/8/34	30	Address—H. B. Barlow .	A. Sawade
Kilkerran	24/9/34	7	Paper from *Journal*	A. Sawade
Bute	20/9/34	10	Address—Mr. McCarter .	H. Perry
Weavers	3/9/34	17	"Sheep Dogs," W. Latty	H. Cornish

WESTERN DISTRICT.

MANGALO (Average annual rainfall, 14in. to 15in.).

CLEARING NEW GROUND.—Paper written by Mr. A. Hannemann.—"This paper refers to the western portion of this district. The scrub should be rolled down in spring and left to dry during summer. Clear a break around the scrub by throwing the scrub in around the edge about 6ft. wide, and then clear a strip about 50 to 60 yards from the edge. This piece between must be burnt out on a cool night. After the scrub is burnt the remaining sticks must be heaped up and burnt if it is to be sown with a combine. A better plan is to leave the sticks where they are and work the land with a disc plough, and then drill it. The plough will pull off a lot of the spring-backs, and they will be very acceptable for the first stubble fire. After seeding is completed, all remaining sticks should be cut. An early wheat should be sown on new ground ,so that it can be reaped before the shoots are too high. A roller of some description should be tied behind the stripper to knock down the straw for fire raking. If summer rains fall, and the ground cannot be burnt, it should be fallowed. If the ground is burnt sow it with either wheat or oats with the plough and drill. The plough will tear off the dry shoots. In the gullies is the only place where the shoots need cutting, and if the straw is rolled again another burn should be obtained. Then fallow with a disc plough and sow a wheat crop the next year, the stubble of which can be burnt. The following year the best plan is to sow with oats and burn off again. Then it can be left for for a feed paddock or fallowed. When it is fallowed stump picking is an endless job."

SOME SUGGESTIONS ON HOW TO BECOME A SUCCESSFUL FARMER.—Mr. J. Evely read the following paper:—"For the purpose of this paper I have divided farmers into three classes—The successful farmer (*i.e.*, free of debt); the farmer harassed by debts and financial difficulties; and the farmer in embryo. (1) The successful farmer has his own experience to guide him, and need not come into this discussion. (2) The harassed farmer needs far wiser heads than mine; but (3) the farmer in embryo, is young and full of hope. He is neither successful nor harassed, but needs careful guidance and training to put him into class 1 and keep him out of class 2. Here are some points worth considering by both himself and his parents—(1) He should never enter into debt. By starting young (12 years) he could establish his stock (sheep, cows, horses) with his parents' assistance—and is this not a duty of the parent? He should be thrifty and swell his banking account with the profits from his stock, wages, and any other project he may run. He should watch his opportunity to buy a cheap farm—and quite often these are available—but pay cash for it. If unable to do this, he should either rent a farm or wisely enter share farming, but always have the principal necessary in hand before commencing any of these three. (2) He should leave mortgages alone. Taking out a mortgage is not a debt (it is an exchange of value for value), but the mortgagee makes himself liable to lose all his previous outlay unless he can repurchase his mortgage with interest added. In 12 years at 6 per cent. the value of a mortgage doubles itself. To take such a risk as a young farmer very often means a burden that will gradually—or quickly—lead him into the unenviable position of the class 2 farmer. (3) He should keep a careful check on all expenses in all things all the time. A careful ledger should be kept showing receipts and expenditure with a yearly balance-sheet. and this should be constantly referred to for future guidance. Without such figures he cannot wisely estimate his future expenditure, nor be sure of which sections of his farm are paying and which are failing. It will also show him quickly and clearly any exorbitant expenses or dangerous balances. (4) He must establish a reserve fund as soon as possible, and increase it rather than decrease it to meet emergencies. This is a fundamental of all sound business undertakings. (5) He should never ridicule, nor pass off lightly the advice of an experienced farmer (whether his parent, neighbour, or Government official). They have had years of practical experience that he has not. Nevertheless, if he is to be a successful farmer he must learn by study, experiment, and experience to make his own decisions. (6) He should educate himself sufficiently well to be able to wisely run a farm. Blacksmithing, harness work, mechanics, shearing, veterinary studies, and particularly arithmetic, are all important studies very often neglected by farmers to their own disadvantage and financial loss." (Secretary, R. Turner.)

NUNJIKOMPITA.

June 28th.—Attendance, 15.

LIME BURNING.—Paper read by the Secretary, Mr. P. Luestner.—"A lime kiln may be made anywhere where the sinking is good, but not on sandhills, because the heat and working at the pit will cause the sand to cave in. A kiln should be built accord-

ing to the quantity of lime wanted, and, when full, be as high above the ground as the depth. A small disused underground tank is ideal for burning lime, it remains clean from dirt, and when shovelling out there is a hard floor to shovel from. In building a lime kiln after it has been dug out, a layer of about 1ft. of mallee boughs should be spread over the bottom, then about 2ft. of mallee stumps, 1ft. of limestone no larger than 3in., and this method continued—a layer of stumps and stones until the top is reached, when it should be finished off with the largest and most solid stumps. It is necessary to have vents in each corner and the centre. Hollow trees are ideal for this. When lighting a kiln, a gallon of petrol can be used to ensure a good start. In selecting stone for burning lime, the harder the stone the better the lime will be, and the longer it will keep in good condition. The red granite-coloured stone found in this district makes better lime than the pure white stone. White stone, when burned, will slake in about three weeks, but the red stone will keep for two or three months.''

WARRAMBOO.

June 8th.—Attendance, 11.

A paper entitled ''The Management of Livestock'' was read by Mr. H. Chilman:—''In these day of low wheat prices it is advisable for farmers to pay more attention to the management and breeding of livestock. The most profitable animals to have on the farm are sheep, for they do not, for the greater part of the year, need very much attention. I do not consider this district suitable for the breeding of fat lambs, so breeders should concentrate on securing a good wool clip. Another very profitable side-line at present is breeding pigs. The best results will be obtained by using a Large White boar on selected sows of the long, lean type. The pigs should not be carrying much fat on the backs, hams, or bacons; smaller hams are preferred, and the pigs should have a large yard to run in as they develop much better. Every farm should have a few cows. I do not think it is advisable to have very many—it is better to keep just two or three and give them more attention. Before calving, a cow should be rested from six to eight weeks and should be in good condition when she calves. A new born calf should be left with its mother for 24 hours and receive its mother's milk for several days. If a calf is well looked after and fed during the first few weeks of its life it will turn out to be a better cow later on. Mix a little bran with the milk on which the calf is fed, and as it grows older the best feed is crushed oats. After the cow has calved, the afterbirth should come away cleanly. If the cow does not get rid of it properly it will cause inflammation and the cow will be very hard to get in calf again. A good disinfectant is as much Condy's crystals as will go on 6d. in 1 gallon of water. Trouble in the udder should be treated at once to prevent mammitis. Apply hot fomentations and rub in camphorated oil or 8 parts of olive oil to 1 of eucalyptus. If a cow has milk fever, she will be lying down, generally on her right side with the head turned round to the flank and in an unconscious condition. Pump up the cow every two hours until she is on her feet; it will not be necessary to tie the teats. If they are tied the teats will be bruised. If a cow is fed with lime six weeks before calving, she will probably not be troubled with milk fever. For cows with colic, give the following drench:—1 tablespoon Epsom salts, 1½lbs. treacle, and 4 tablespoons ginger. For a cow with gas in the paunch, give Stockholm tar and make a bit with thick rope dipped in tar. If it is necessary to open a cow, put in the knife on the left side, midway between the hip and last rib. A very good lick can be made from the following ingredients:—Coarse salt 20 parts, air-slaked lime 30 parts, bonemeal 50 parts. This lick is most needed when feed is dry.'' (Secretary, F. Chilman.)

July 6th.

SANDHILLS.—Mr. P. Daniel read the following paper:—''Personal experience has proved to me that the more sandhills drift in the paddock the better crop they and the adjoining flats grow. Along roads the best thing to do is to keep fences clear of rubbish and sow oats for a couple of chains in. These can be fed off with sheep, and the roots of the plants would help to bind the sand and keep it from drifting. In dry years the flats do more damage with drift than old sandhills. The main thing is to clear the sandhills of roots and stumps as quickly as possible. Dry ploughing will pull out more stumps than wet ploughing. Two years ago I had new ground burnt the year before, but was unable to crop or fallow it. This had a big sandhill. I used a foot plough in this paddock when it was wet in the early part of June, with the mouldboard down the hill. The result was stumps that took a lot of picking, but a good crop right to the top, and then a good burn. It is far better to plough sandhills as new ground than fallow them. The crop helps to keep the sand from drifting into heaps and hollows over the rubbish, and it is impossible to pick everything clean enough to stop this. After the second ploughing with a good foot plough,

there are not many stumps left or much rubbish, and the hills blow evenly. I do not advocate a disc. This implement, no doubt, does the same job so far as producing a good crop is concerned, but it does not put the farm ahead in clearing out the stumps and roots while they are green. Shoots are a lot easier killed after a good ploughing. Thirteen years ago I had a plough and used it for one seeding. The sandhills that were ploughed then are clean and grow good crops. For four years I used the cultivator; this was quicker, but did not clean out the stumps. If these paddocks were left out for a few years, the sandhills—although they were fire raked every year—would have just as many shoots as before, besides drifting into hollows and ridges. I then used the combine, which, of course, acted the same as the cultivator. For the last five years I have been using the heavy plough. This means a lot of stump picking, but all the sandhills that have been ploughed twice are practically free from stumps and rubbish, excepting for a bit of undergrowth bush, which will, no doubt, trouble us for a few years yet. It is far better to pick one stump than to cut the shoot on it half a dozen times. Unfortunately we cannot always do as we would like in this country, because of the large areas and lack of finance. I advise the first two years wheat, then, if possible, fallow before the first rains. This would provide feed from a self-sown crop, which would be better than winter fallow and turning under the self-sown crop, providing, of course, it could be kept clean with sheep. Being practically new ground, there should not be anything further than self-sown to worry about. If unable to fallow, sow oats, burn the stubble, and then fallow. A good ploughing and two or three burns, then fallow, and the sandhills will be clean. My experience has been super the sandhills as heavy as one can, they will grow better crops. One sandhill I cropped in 1920, ploughed the next year, and then sowed wheat until 1927. On the sixth crop I put one bag of super to the acre. It made a fair improvement that year, but the next year the crop was very high and thick. The last crop went out in barley grass. We had no trouble with takeall or in keeping the ground clean for a number of years, until the older paddocks started to grow barley grass. One naturally looks for takeall to show first in the sandhills, so that I advise working the following four-year rotation after new ground:—(1) Fallow; (2) wheat; (3) oats for hay, seed, and standby for stock; (4) oats without super to be fed off. This enables a farmer to procure the best out of the land, without any fear of takeall, and to stock very heavily with sheep. Fences should never run along the top of sandhills, because the sand blows out and the posts fall down. Where fencing runs over the sand, all shoots and rubbish should be kept clear. Plough around the fences as close as possible—using leaders. Most farmers rely on the fire rake, my experience has been the plough first, with the fire rake second place on our farms. This will give a running burn.'' Mr. H. Tucker read a paper on "Fencing.'' (Secretary, F. Chilman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Yadnarie	21/8/34	12	"Care of Machinery," K. Kobelt	E. Spriggs
Taragoro	23/8/34	11	Inter-Bureau Visit, Roberts and Verran Branch	T. Winters
Taragoro	20/9/34	7	Discussion	T. Winters
Warramboo	31/8/34	6	Discussion	F. Chilman
Laura Bay	15/8/34	14	Field Day, and Address—W. H. Brownrigg	P. Morrison
Wudinna	31/8/34	10	Formal	D. Duguid
Roberts and Verran	25/7/34	10	Address—H D. Adams	C. Masters
Roberts and Verran	23/8/34	—	Visit to Taragoro A. B.	C. Masters
Green Patch	24/8/34	9	Discussion	C. J. Whillas
Pygery	21/8/34	10	Discussion	A. Day
Pygery	18/9/34	10	Discussion	A. Day
Kyancutta	4/9/34	11	Discussion	E. Kelly
Kyancutta	18/9/34	12	Field Day	E. Kelly

EASTERN DISTRICT.

LONE GUM AND MONASH.—June 21st.

Asked as to the correct methods of pruning Malagas, Grenache and Shiraz, Mr. N. Fotheringham, Manager of the Berri Orchard, said:—Malagas were rod and spur or just spur pruned (either method, but rod and spur was preferable); Grenache, spur pruned; Shiraz, rod and spur. "Is gypsum detrimental or otherwise on salty ground?" was answered to the effect that in the case of black alkali, it was effective, but as most of the salt in this district is of the other type, it had little effect on the soil. Would it be advisable to cincture grafted currants with a strong growth, having four arms formed? Providing the growth was good, the speaker advised the use of a single cut, but no more. The best time to plough oranges, was asked, to which a reply was given that as citrus roots became active early, having a very short dormant period, now would be an opportune time.

Cinturing of Vines.—Mr. Fotheringham was asked had he had any experience with second cincturing of currants. There were no tests in this connection, but he said he had done it to counteract the effect of water at an inopportune time. To effect the setting of the end vines the speaker thought this method might be effective —a double cut at first and followed about 10 days later with a single cut. The observations at the Government orchard at Berri had led them to advocate cincturing when the caps were falling freely on the ground. Cincturing when the fruit was the size of a shot had been tried, but did not give the required crop. Mr. Fotheringham was asked his opinion as to the value of sulphur when drilled in. Generally speaking it was shown to be of little manurial value, however the Waite Research Institute were experimenting in this direction, and he understood that in their work they had isolated another bacteria and this might lead to results with a good effect. This work was being carried out and tests taken—it was too early to speak of definite results yet. The various methods of training the currant vine came up for discussion. Various systems tried out at the orchard were explained by Mr. Fotheringham. The best results had been shown by vines trained on the three-armed espalier method which, over a period of 16 years, had shown an average yield of 5,105lbs. Questioned as to whether the growth would not ultimately go to the top wire, he stated that it was shown that approximately 50 per cent. of the growth went to the top wire; this, however, was growth, not fruit. The vines under discussion had always been pruned that way and had maintained their crop.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Lameroo	24/8/34	18	Paper—W. J. Morcomb .	A. Potter
Lameroo	28/9/34	7	Discussion	A. Potter
Coomandook ..	31/8/34	20	Address, W. J. Spafford..	W. Trestrail
Coomandook ...	24/8/34	7	Address—R L. Griffiths	W. Trestrail
Kulkawirra.....	11/9/34	8	Address— C. Robin	H. Elliott
Overland Corner	26/9/34	12	Address—Mr. Chaston ..	L. Atkinson
Taplan	19/9/34	26	Address —C. A. Goddard	P. R. Hodge

SOUTH AND HILLS DISTRICT.

SHEEP DIPPING ON THE FARM.

[*Paper read by H. Higgins at the June meeting of the Currency Creek Branch.*]

For upwards of 100 years the battle has gone on between the manufacturers of sheep dip and the chief parasites of sheep—the louse and the ked, commonly known as the sheep tick.

There are roughly three classes of sheep dip made, namely:—(*a*) The Arsenical Powder Dip; (*b*) the Arsenical Liquid Dip; (*c*) the Non-poisonous Liquid Dip; and of these three, the first two are most generally used, employing as their destroying agent the poison arsenic.

It has been found that this poison in combination with other substances makes the safest and most useful compound to use in the destruction of parasites. It is applied extensively with lead as a spray against the codlin moth, with sodium against cattle tick, and with sulphur as a destroyer of sheep louse and tick.

In every case water is used as a carrier of these poisonous compounds, the idea being to cast a film over the animal or fruit, of very small particles of arsenic; so that the parasite, when feeding on its host will devour some of this poison and die. This actually does take place, but there are other dips made called non-poisonous, these depend on coming in contact directly with the parasite, to destroy it, and are known

as contact dips, as against the arsenic varieties which depend for their success on the poison getting into the stomach of the parasite, and are therefore known as stomach poison dips.

Manufacturers have never had much difficulty in making a dip to destroy live lice or tick, in fact if this were the only trouble, the writer ventures to say that the starlings and willy wagtails with the help of the sheep would make quite a good job for the first two months.

The female louse, it has been computed, lays about 5,000 eggs at a time, and these usually hatch out in 6 or 7 days, and in 11 or 12 days from this the females are ready to reproduce their kind. The eggs of the tick on the other hand take 21 days to hatch out, and under unsuitable conditions such as a cold period, have been known to run as long as 42 days. The young ticks take about the same time to mature as the louse; but it is the sheep louse that is most to be dreaded, as it can spread through a flock with very great rapidity.

The late Inspector Williams, who made a very careful study of these enemies of the sheep farmer, pointed out that the control of the tick was an easy matter when compared with the louse, and he went on to say that he knew of a case when a single ram infected with lice made the whole flock dirty.

Manufacturers of sheep dip must provide that the poison they employ to destroy the parasites should remain on the skin of the host in such quantity as to destroy the young parasites when hatching out. If the period required was only, say, 42 days, the task might be a fairly easy one; but as dipping in the various parts of the State begins from about the end of October and goes on even as late as February, one can readily see that sheep dipped in October would have to run the risk of infection until the February farmer has dipped his flock—probably 3 months later. Then, of course, there are the strays missed at mustering which never get dipped at all, and so, to have a really efficient dip, the farmer must use one which retains its poison on the skin for the longest period.

The difficulties of the manufacturer can be grasped to a certain extent, even by the novice, when one realises that the poison must remain active on the sheep in spite of evaporation or heavy rain; in fact some well known manufacturers are quite frank over the matter and readily admit that their sheep dip has a very definite life of usefulness, and that there comes a time when dipped sheep, if allowed to run with those undipped, will become infected.

For this reason I favour a stomach poison dip in lieu of a contact one.

My experience of some 30 years bears this out, for during that time I have used several makes of sheep dip, all of which have been most effective on the live parasite, and then tailing off in their usefulness as time went on. I have often crutched my whole flock in May without finding a single tick, but I cannot say this when shearing arrives.

Not only has the manufacturer to contend with the period of incubation of the egg, the weather, either of heat or rain, to spoil his dip, but he must use a poison that will not injure the wool on the skin or as it emerges therefrom, and when one has examined in detail the intricate way in which wool is produced, one can easily understand how careful the maker must be to use a safe poison.

The wool commences its journey through the skin from a network of nerve centres and blood vessels, and it is quite possible that some sheep less robust than others could have a check in the growth of its wool by some sudden shock such as dipping; but in 9 cases out of 10 the break is really due to lack of nourishment, impairing the blood supply, which helps to produce the wool and also the grease commonly known as yolk. The yolk serves to oil the fibre on its passage to and whilst exposed to the air.

Sheepmen could improve the results of dipping in many ways, and I have often seen a sheep dip condemned, though the user has to a large extent completely ignored the maker's directions.

We are apt to make the dipping fit in with out farm work and take second or third place to other business, for instance, the amount of wool to carry the poisonous particles of dip is very important; if too short, evaporation or rain can destroy a large amount of its usefulness; if too long, considerable difficulty will be experienced in getting the poison on to the skin where the parasites feed. Especially is this the case in many of the short-swim dips about the State; and also the sheep are often hurried through, many not having their heads and backs thoroughly soaked.

Dipping is necessary because the parasites, if left unchecked, would injure the wool and stunt the growth of the sheep, the loss through the presence of these parasites many times out-weighing the cost of dipping. Every sheepman must admit that the dipping does act as a check in the condition of the sheep for approximately 2 weeks, and it is unfortunate that this has become so necessary.

There is also a certain amount of loss through dipping for which often the dip is blamed; even under the most careful conditions a few sheep invariably die, although the percentage is hardly noticeable. Most of the deaths I venture to say would occur

if plain water were used [illegible] that the [illegible]ep is called upon to swim up to 60[illegible] is not natural to the animal, and finds out any [illegible]st.

It must be understood that not every sheep is perfectly physically fit, and this **thorough soaking** coupled with perhaps **a change** in the weather, may bring on **pneumonia.** Also, dipping fat sheep overheated by travel is an almost certain way to cause mortality, and the writer has experienced loss in this way, especially with fat rams. An odd sheep or two may be lost through blood poisoning, for germs can get into the blood stream through cuts, bruises, or dog bites, and it is far more difficult to disinfect a sheepyard than a woolshed.

In conclusion I would like to suggest a few very important points relating to dipping but which are well known to most of you, and may seem superfluous.

SUMMARY.

(*a*) Begin dipping with a clean bath of known capacity, and check the quantity of water put in to each packet of dip.

(*b*) Have a strainer or sieve to skim off the foreign matter which always becomes present with dipping.

(*c*) Dip sheep under pleasant weather conditions, and see that the sheep have had a good rest before dipping, preferably the night before.

(*d*) Keep the bath well stirred and see that each sheep is thoroughly immersed.''

SPRINGTON AGRICULTURAL BUREAU.

The Annual Pruning Competitions conducted under the auspices of the Springton Branch of the Agricultural Bureau were held on July 18th. Messrs. W. Bietz, of Tanunda, and E. Leishman (Horticultural Instructor of the Department of Agriculture) acted as judges and made the following awards:—

Competitor.	Shiraz.	Grenoche.	Total.
G. Starick	89	92	181
H. Eckert	89	90	179
H. Lorke	92	85	177
E. P. Filsell	84	93	177
J. Kruger	89	88	177
R. Rayner	91	84	175
C. Lorke	86	88	174
R. Starick	83	90	173
K. Engel	88	84	172
E. Brokate	85	85	171
W. Kluge	91	80	181
I. Wegener	86	85	171
W. Lorke	90	81	171
R. Moody	82	85	167
K. Bishop	86	80	166
M. Kroehn	86	—	86
D. J. Bain	—	84	84

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Hartley	29/8/34	6	"Horses," H. Brook	J. Brook
Cherry Gardens	25/8/34	17	Visit to Kuitpo	A. Stone
Cherry Gardens	22/9/34	14	Question Box	A. Stone
Inman Valley	30/8/34	28	Address—H. H. Orchard	A. Fuller
Lenswood and Forest Range	27/8/34	40	Address—M. Vickers	B. Lawrence
Finniss	10/9/34	12	"Banking," S. Collett	L. Dunn
Blackheath	30/8/34	30	Address—M. Aird	E. Paech
Blackheath	11/9/34	—	Address—A. H. Codrington	E. Paech
Inman Valley	14/9/34	34	Address—D. Richmond	A. Fuller
Echunga	12/9/34	23	Discussion	L. Walters
Hartley	18/9/34	12	Address—C. Fahrmann	J. Brook
McLaren Flat	20/9/34	—	Address—H. J. Apps	P. T. Wait
Yundi	19/9/34	—	Homestead Meeting	T. Smart
Hope Forest	3/9/34	22	Field Day	E. Muldoon

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

GOOD THINGS FROM THE OVEN.

[By GRACE B. ARMSTRONG, A. MARIE SCHRIEBER, and MARY A. MCPHEE, of the University of Illinois, Urbana, U.S.A.]

COOKIES.

Cookies are small cakes made thin and baked quickly. They contain practically the same ingredients as do ordinary cakes but in different proportions since the small, flat cake may be made very rich. In addition to wheat flour, oatmeal and various other flours may be used in cookies. The technique of making perfectly shaped, well-flavoured cookies is somewhat hard to master. When first learning, it may be necessary to use more flour than is needed later.

Use the general method for mixing cake previously described.

The amounts given for each recipe are only approximate. The number of cookies will depend on size of cutter and thickness of dough.

Method of Rolling.

How.	*Why.*
Put small amount of flour on kneading board. On this flour put about 3 heaping tablespoons of cookie dough. Do not take out a large quantity of dough at a time.	A very small amount of flour is sufficient to keep dough from sticking to board. If cookie dough is handled too much and flour is mixed into it, cookies are often stiff and tough.
Turn dough over so that floured side is on top. If necessary, again sift a small amount of flour on board.	
Roll lightly, lifting rolling pin frequently and rolling in a different direction each time until the dough is about ¼in. thick.	If pressure is exerted dough is likely to stick to board.
With a cookie cutter, cut cookies as near each other as possible. Try to avoid leaving any large irregular pieces of dough.	The amount of trimming should be as small as possible for this dough must be rolled a second time. Dough that is worked over is not so light as the first dough and is often too stiff for best results.
With a spatula or flexible knife, lift cookie off board, and without handling it place it on a greased cookie pan.	Cookie dough is very sticky, and if touched will stick to the fingers and make a badly shaped product. With a little practice, one can easily slide cookies off the spatula without touching them.
A little sugar may be sprinkled on top of cookies before putting them into oven.	The sugar gives cookies a finished appearance when baked.
Gather up trimmings and roll again until all dough is used.	

Method of Baking.

How.	*Why.*
Bake in moderate oven (375°F.) for 5 to 7 minutes.	Cookies should be baked quickly so that they will not dry out, but they should have a medium-brown colour.
When baked, remove from pan by slipping a spatula or flexible knife under cookies. Place them on a wire rack to cool before piling in a jar.	Cooling before storing helps to keep cookies well shaped and crisp and prevents them from sticking together.

Oatmeal Drop Cookies.

Equipment.

- 1 mixing bowl
- 1 measuring cup
- 1 teaspoon
- 1 mixing spoon
- 1 flour sifter
- 1 spatula
- 1 food chopper or chopping bowl
- 1 mixing knife
- Baking pans

Materials.

1 c. sugar	$\frac{1}{2}$ t. soda
$\frac{2}{3}$ c. shortening	1 t. baking-powder
$\frac{1}{2}$ c. sour milk	1 t. cinnamon
2 eggs	$\frac{1}{4}$ t. cloves
1 t. lemon extract	$\frac{1}{4}$ t. nutmeg
2 c. oatmeal	1 c. raisins and currants
2 c. flour	1 c. nuts

Amount: 4 or 5 dozen cookies.

Method.

Use general method for mixing cake. Combine in order given above. The oatmeal should be added to the liquid ingredients and allowed to become thoroughly moist before flour is added. Chop fruit and nuts, flour well, and add at the last. Stir until well blended. Drop from a spoon on to greased pans. (These cookies will have a better shape if a small spoon is used to push the dough off the stirring spoon.) Bake in moderate oven (375°F.) for 8 or 10 minutes. Keep in a covered stone jar. The flavour is better after cookies have been kept a few days.

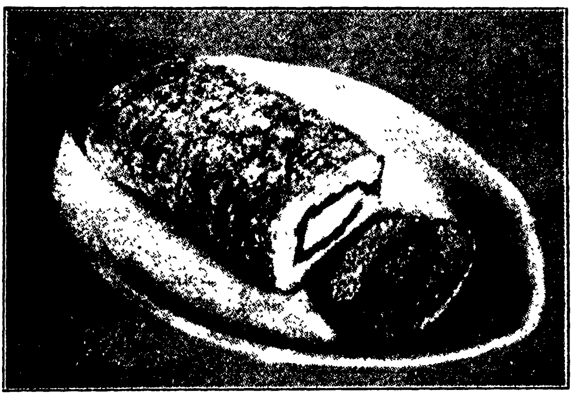


Fig. 13.—Jelly Roll.

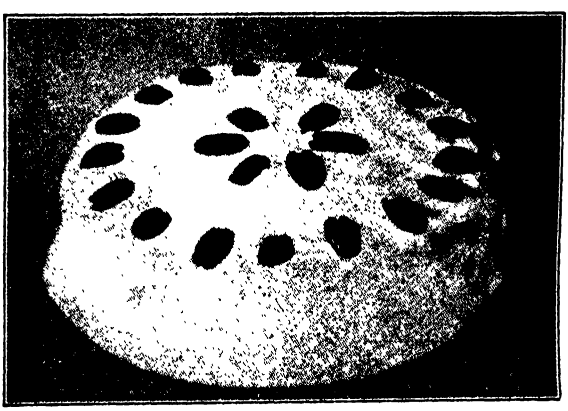


Fig. 14.—Layer Cake, filled and iced.

Fig. 15.—Devil's Food Cake.

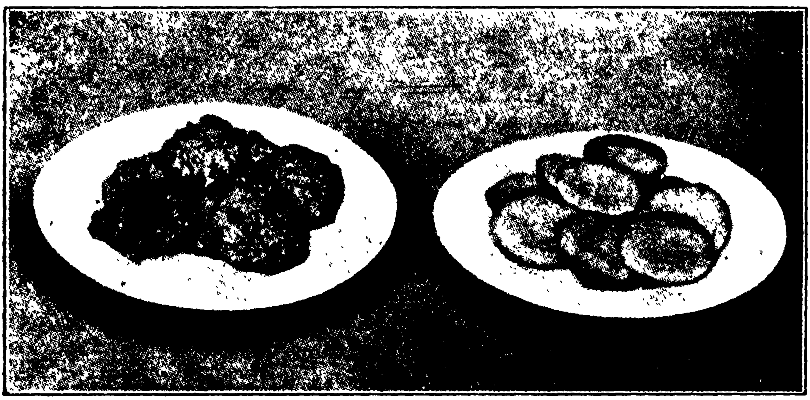


Fig. 16.—Oatmeal Drop Cookies and White Rolled Cookies.

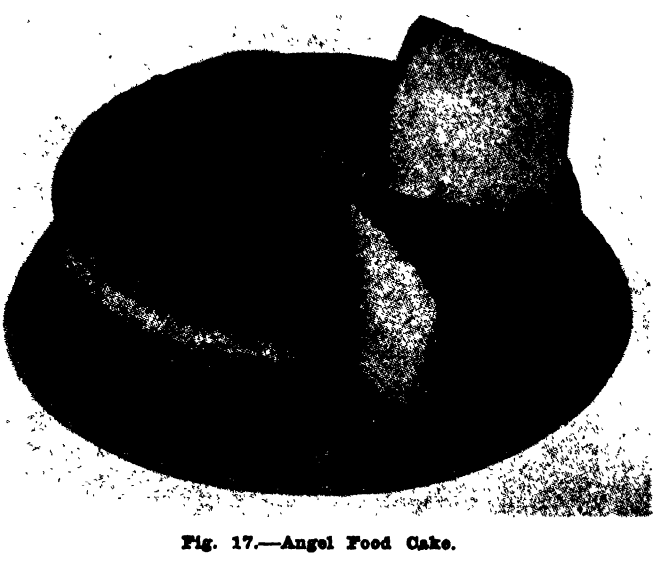


Fig. 17.—Angel Food Cake.

WHITE ROLLED COOKIES.

Equipment.

1 mixing bowl	1 board
1 measuring cup	1 rolling pin
1 teaspoon	1 spatula
1 mixing spoon	1 flour sifter
1 cookie cutter	Baking pans

Materials.

½ c. butter	½ t. lemon extract
1 cup sugar	2¾ c. flour
½ c. milk	2 t. baking powder
2 eggs	½ t. grated nutmeg

(Variations may be made by adding chocolate, fruit, or nuts.)

Amount: 4 dozen cookies.

Method.

Use general method for mixing cake and general method for rolling cookies.

MOLASSES COOKIES.

Equipment.

Same as for white rolled cookies except for addition of small saucepan.

Materials.

½ c. shortening	2½ c. flour
½ c. molasses	½ t. soda
½ c. sugar	½ t. cinnamon
¼ c. cold water	½ t. ginger
½ t. vanilla	⅛ t. nutmeg
1 egg	

Amount: 5 dozen cookies.

Method.

How.	*Why.*
Place shortening, sugar, and molasses in saucepan. Mix well and bring to boiling point. The mixture must be carefully watched and stirred because it burns easily.	Cooking thoroughly blends these ingredients.
Remove from fire. Add cold water, stir well, and allow to cool before other ingredients are added.	A warm product requires more flour to prevent stickiness than does a cool product. If mixture is not allowed to cool, there is danger of making cookies too stiff. Mixture must be cool to prevent coagulation of eggs.
Add beaten eggs and vanilla. Sift and add dry ingredients. Stir well.	

In rolling follow general directions (see page 420), but remember that molasses cookies should not be rolled as this as either white cookies or ginger snaps. Bake in moderate oven (350°F.) about 10 minutes; watch closely. Great care is required in baking these cookies because the molasses in them will cause them to burn easily. These cookies will keep moist a long time. A variation of them may made by adding nuts, in which case less shortening is used.

Ginger Snaps.

Equipment.

Same as for molasses cooking.

Materials.

1 c. molasses	½ t. soda
½ c. fat	1 Tb. ginger
3¼ c. flour	1½ t. salt

Amount: 7 dozen cookies.

Method.

How.	*Why.*
Heat molasses to boiling point and pour over shortening.	Boiling molasses even slightly condenses it. Hot molasses melts shortening, and the mixture serves as a liquid into which the other ingredients can be blended.
Add dry ingredients mixed and sifted. Chill thoroughly.	Dough is more easily handled and can be rolled thinner when cold.
Roll as thin as possible. Cut into small cookies. Keep bowl in a cold place during the rolling process.	If dough gets warm, it will be sticky; more flour will then be needed and cookies will be stiff rather than crisp.
Bake in moderate oven (350°F.) about 10 minutes. Allow to cool before packing.	Ginger snaps lose their crispness if packed while warm.

Ice-Box Butterscotch Cookies.

Equipment.

1 mixing bowl	1 *sharp*, thin-bladed knife
1 mixing spoon	1 flour sifter
1 measuring cup	Baking pans
1 teaspoon	

Materials.

1½ c. butter	2 eggs
2 c. brown sugar	3 c. flour
2½ t. baking powder	

Amount: 5 or 6 dozen cookies.

Method.

Cream butter, add sugar, then beaten eggs, and mix well. Add flour and baking powder sifted together. Mix and knead slightly. Shape into a roll, then chill thoroughly. Slice ¼in. thick. Bake on ungreased pan in moderate oven (375°F.) for about 10 minutes. The dough may be kept in a refrigerator for several days, then sliced, and baked as fresh cookies are desired.

UNSHORTENED CAKES.

Ingredients.

Sponge cake is typical of cakes made without shortening. Since the gluten is not shortened and egg white are the only leavening agent, special care is needed in combining the ingredients.

The sugar should be fine. Only fresh eggs can be beaten sufficiently to make a light product. Any soft-wheat flour or pastry flour may be used; since the gluten is unshortened, bread flour would make a tough cake.

Method of Mixing.

The mixing of a sponge cake requires much more skill and care than the mixing of a shortened cake.

General Method.

How.	*Why.*
Sift sugar.	Sifting removes lumps and separates grains of sugar so they are easily dissolved in the small amount of liquid used.
Sift flour 4 or 5 times before measuring and be careful not to pack it in cup when measuring.	Sifting increases bulk of flour by separating the particles and incorporating air between them. Also, if the particles of flour are separated they can be mixed more thoroughly and easily with egg whites. Ever so little extra flour may make a sponge cake too stiff.
Separate whites and yolks of eggs.	Since air is the only leaven used, it is necessary to beat egg whites separately so that a larger amount of air may be incorporated.
Just before they are to be used, beat egg whites with a wire beater until *stiff*, or until they will stay in the bowl when it is inverted. Do *not* beat them until dry. (Lift beater up and out of the egg whites with each stroke.)	Beaten egg whites quickly lose their lightness on standing. A wire egg beater makes the product lighter than does a Dover beater. If beaten until dry, the albumin walls will have been stretched so far that they will be very fragile and will not stand the strain of further beating or the addition of other ingredients.
Mix other ingredients with beaten egg whites by using cutting and folding motion. To do this put the spoon or spatula edgewise into middle of the dough, slide it under dough and bring it up at the edge of bowl, at the same time folding that part of dough toward the centre. Turn bowl each time so that a new portion of dough is folded over. Try not to stir product but let the cutting and folding motion thoroughly mix egg whites into dough.	Any other method of mixing would break the delicate albumin walls; the leaven would escape and product would be heavy. As an illustration, beaten egg whites may be compared to the honeycomb and the incorporated air to honey in the comb. When cutting a comb of honey, very little of the liquid is lost if a knife is used and a straight cut is made down through comb; but if it is stirred with a spoon, many cells are broken and much honey lost. In the same way the cutting and folding motion used in incorporating beaten eggs into a mixture breaks only a few of the albumin cells.
Carefully slide cake mixture out of mixing bowl or platter into an *ungreased* cake pan.	Sliding the mixture tends to preserve air cells of beaten egg white. By leaving pan ungreased a surface is furnished to which cake will cling as it rises, thus helping it both to rise and to keep its shape.
Use a standard angel food cake pan.	The hollow stem in centre makes it possible for heat to penetrate evenly to all parts of cake.

Baking Unshortened Cakes.

As already stated, the baking of a cake largely determines its success. The oven should be hot enough at first to expand the air rapidly and start the cake rising, but it should not be so hot as to form a crust or start the browning. Since egg white coagulates at a low temperature, produces made of it must be cooked very carefully. However, if baked too slowly, the cake is likely to dry out and not rise sufficiently.

This type of cake should bake in a slow oven (300°F.) 1 to 1½ hours, the exact length of time depending on its size. Do not open oven door for first 20 minutes of baking. Be careful not to jar oven while cake is baking. When done, invert cake pan over a wire rack in a place free from draughts and allow cake to hang in pan and cool gradually. If removed from the pan while warm, cake will fall because the delicate albumin walls have not completely set.

For serving cut with a thin-bladed, sharp knife, using a light, quick stroke, or pull apart with two forks.

Sponge Cake.

Equipment.

1 platter or big bowl	1 mixing bowl
1 teaspoon	1 grater
1 egg whip	1 measuring cup
1 flour sifter	1 rolling pin
1 tablespoon	1 cake pan

Materials.

5 egg yolks	1 Tb. cold water
1 c. sugar	¼ t. salt
½ t. grated lemon rind	5 egg whites
1 t. lemon juice	1 c. flour

Amount: 1 cake 9in. in diameter.

Method.

How.	*Why.*
Roll and sift sugar. Sift flour before measuring. Be careful not to pack it in cup when measuring.	Rolling sugar makes it finer. Sifting removes lumps and separates grains of sugar so they are easily dissolved in the small amount of liquid used.
Grate lemon rind into sugar.	Sugar separates the moist particles of lemon rind and quickly absorbs lemon flavour.
Separate whites and yolks of eggs. Beat yolks until thick, being careful to scrape down any yolks that may stick to sides of bowl.	Particles of egg yolk will stick to the bowl and dry on it; these may make yellow flakes in cake.
Gradually beat in sugar and grated rind; then add lemon juice and water.	Acid makes egg whites more tender after baking, and a better texture results.
Beat egg whites with a wire beater until stiff, or until they will stay in the bowl when inverted. Do *not* beat them until dry. Lift beater up and out of the egg whites with each stroke.	Beaten egg whites quickly lose their lightness on standing. A wire egg beater makes product lighter than does a Dover beater. If beaten until dry, the albumin walls will be very fragile and will not stand the strain of further beating or the addition of other ingredients.

Cut and fold part of whites into yolks and sugar. Then gradually cut and fold in the flour.	There is not enough liquid in yolk mixture to make a batter of flour; consequently a part of egg whites must be added before any flour is added.
Cut and fold in rest of egg whites. Do not stir or beat.	By adding a part of egg whites at the last, greater lightness of product is insured.
Put in ungreased pan. Bake immediately in slow oven (300°F.) for 1 to 1½ hours. (See general directions for baking unshortened cakes.)	By leaving pan ungreased a surface is furnished to which cake will cling as it rises, thus helping it both to rise and to keep its shape.

Angel Food Cake.

Equipment.

1 platter or large bowl	1 flour sifter
1 cup	1 egg whip
1 teaspoon	1 tablespoon
1 rolling pin	1 angel food cake pan

Materials.

1 c. or 9 egg whites	¾ c. sugar
¼ t. salt	¾ t. vanilla
¾ t. cream of tartar	¾ c. flour

Amount: 1 cake 9in. in diameter.

Method.

How.	*Why.*
Roll, sift and measure sugar. Sift flour and measure lightly, being careful not to pack. Sift again 4 or 5 times.	(See *General Method.*)
Pour egg whites on a large platter or bowl, add salt, and beat with a flat wire egg beater until foamy.	A flat wire egg beater will incorporate more air in egg whites than will a Dover egg beater.
Add cream of tartar and continue beating until eggs are stiff but not dry.	Cream of tartar seems to make cake whiter and prevents its shrinking while baking.
Gradually fold in sugar, add flavouring, then gradually fold in flour. Use as few motions as possible by making each one count.	Too many motions may remove most of air from cake; if not enough motions are made, cake may be coarse-grained.
Pour in ungreased pan and bake in slow oven (300°F.) 1 to 1½ hours.	

Kisses.

Equipment.

1 mixing bowl	1 measuring cup
1 egg whip	2 teaspoons
Baking pan or board	

Materials.

2 egg whites	½ c. fine granulated sugar
¼ t. vanilla	

Amount: 2 dozen 1½in. in diameter.

Method.

How.	*Why.*
Beat egg whites until stiff but not dry.	(See *General Method.*)
Add half the sugar and beat.	The albumin walls are not strong enough to hold the entire amount of sugar at once. The water in the egg whites tends to dissolve the sugar as the eggs are beaten. If all the sugar were added at once, a syrup would form and product would be sticky rather than light.
Beat until mixture will hold its shape.	The dissolved sugar must be thoroughly blended with egg whites.
Cut and fold in remaining sugar and add flavouring.	By folding in half the sugar at the last, the sugar does not have a chance to dissolve before product is baked.
Shape with spoon or pastry bag on wet board covered with oiled paper. If board is not available, use bottom of baking pan covered with oiled paper. Bake in slow oven (300°F.) 15 to 20 minutes.	Because the albumin of egg white cooks very easily, it is necessary to protect this product from too much heat. A board does not hold heat as does a tin mould; and if wet, will not become scorched or burned in the oven.

(*To be continued.*)

[Next month's issue will deal with Frostings and Fillings.]

NELSHABY (Average Annual Rainfall, 17in.).

June 26th.—Attendance 33.

The evening took the form of a competition of pastry and needlework, the former three samples of each of four varieties of pastry, the latter a pair of pyjamas for night wear. Mrs. Orchard of the Belalie Branch acted as judge and gave a short paper on needlework. Mrs. R. P. Noble was awarded first prize for pyjamas, Miss I. Franks second. The first prize for pastry went to Miss A. Lawrie, whilst Miss E. Franks took second in that division. A short musical programme was given. (Secretary, Mrs. T. Franks.)

PARRAKIE (Average annual rainfall, 14.64in.).

June 26th.—Attendance, 14.

Papers read by Mrs. Lahne and Miss Hamilton on "Dairying Methods".—(*Mrs. Lahne*): "I think the Shorthorn the most profitable cow to keep. Some prefer the Jersey cow, but they are too delicate. The Jersey does not do so well on dry feed as other breeds of cows. They are a very good breed but need a lot of greenfeed, and are only suitable for districts where there is an abundance of green fodder. They also feel the cold weather more than other cows, and thus need a lot of shelter. The Shorthorn is a hardier breed. I have a crossbred cow that is 13 years old and still gives a good quantity of milk. I feed my cows twice a day, giving them a tub full of chaff and plenty of bran for each meal. One of the main points of dairying is to milk at regular hours. The next point is cleanliness. The cowyards and sheds should be kept as clean as possible; the floors should be cemented, and sloping so they can be hosed down. Wash the cow's udders before milking, preferably in a weak solution of Condys, otherwise use warm water. See that buckets are quite clean. They should be well washed with a little washing soda in the water, then scalded and put to air. The same applies to the separator. It must be taken great care of and kept very clean. When separating, the cream should be cooled as quickly as possible and kept at a low temperature. Stir the cream daily. Deliver cream as often as possible to the factory for best results."

(*Miss Hamilton*): "Dairying at the present time is not nearly as profitable as it has been for a good many years; butter all over the world is more plentiful and is produced cheaper, and many people are not able to buy and use as much as they would like. In buying a cow we should look for a cow with outstanding eyes, a brushy tail, square udder, a fine silky skin, and large milk veins. Kindness and gentleness are very necessary in handling a cow, and cleanliness in all things in connection with

dairying is most essential. When milking, brush the side and udder of the cow, wash the teats and dry them. Dry milking is better and cleaner than wetting the teats. To have good cream and butter, keep buckets and all utensils and hands perfectly clean. Buckets and utensils should be washed and scalded and put in the sun. Secure good cows; one good cow does not eat as much as two poor cows and will give just as much butter. It is necessary to have plenty of good food for cows; bran or oats, and chaff is good for dairy cows, salt is also a necessity. A cow should have as much salt as she will consume. As soon as milking is finished, strain the milk and put it through the separator; then the cream should be cooled off as soon as possible. Cream should be about three days old for churning.'' (Secretary, Miss J. Halliday.)

PENOLA (Average annual rainfall, 26.06in.).

June 6th.—Attendance, 41.

Mrs. A. V. Zed, Secretary of the Alsatian Club of South Australia gave a short lecture on Alsatian dogs.

Biscuit competition, judged by Mrs. R. Black: Mrs. Thos. Oswald first, Mrs. W. A. Clifford second, and Mrs. F. J. Kidman third. The judge spoke highly of all entries.

Biscuit Recipes.—*Plain Biscuits*: 3 cups flour, 1 cup each dripping and sugar, 2 teaspoons cream of tartar, 1 teaspoon each soda and salt. Beat dripping and sugar, add ½ cup of milk, then flour with cream of tartar and soda mixed in. Roll fairly thin and bake in moderate oven for 10 minutes. *Champagne Biscuits*: 2 cups flour, ¼lb. dripping, 1 cup sugar, 1 teaspoon cream tartar, ½ teaspoon soda, 1 egg, 1 tablespoon milk. Beat egg and sugar together, add milk, rub dripping in flour, mix into a stiff dough, bake 10 minutes. *Raspberry Wafers*: 2 cups flour, 1 cup sugar, ½lb. dripping or butter, ½ teaspoon cream tartar, ¼ teaspoon bicarb. soda, ½ cup milk. Roll out as thin as possible. Cut and bake in a quick oven 5 to 10 minutes. Ice and spread jam between. *Oatmeal Biscuits*: 2 cups plain flour, 1 cup each oatmeal, sugar, and dripping, pinch salt, 1 teaspoon cream tartar, ½ teaspoon bicarb. soda, ½ cup milk. Cream dripping and sugar, rub in flour and cream tartar and soda. Mix with the milk, bake in moderate oven 15 minutes. *Hot Water Biscuits*: 3 cups flour, 1 cup each dripping, sugar, and hot water, 1 teaspoon each cream tartar and bicarb. soda. Rub flour, sugar, and dripping, then add cream tartar, and bicarb. soda. Bake 20 minutes. *Cinnamon Biscuits*: 2 cups flour, ¼lb. dripping or butter, 1 cup sugar, ½ teaspoon b. soda, 1 tea-

spoon c. tartar. Rub butter into flour, with 1 teaspoon each cinnamon and allspice, mix with ½ cup milk, roll out and bake in moderate oven 15 minutes. *Light Biscuits*: ½lb. butter, 1lb. flour, 1 cup sugar, 1 teaspoon cream of tartar, ½ of soda, 2 eggs, roll out thin, bake in brisk oven, put two together with jam. *Shortbread Biscuits*: Take ¼lb. each butter and sugar, a good ½lb. S.R. flour, 1 egg, a little essence. Cream butter and sugar, then add flour, egg, and essence until a nice soft dough. This is suitable for forcer. *Potato Biscuits*: Prepare 1½ cups of hot mashed potatoes, measure ¾ cup butter, ½ cup each golden syrup and treacle into a saucepan, stir over fire until melted, then add potatoes. Remove from fire and stir in 2 cups flour, sifted, with ¾ teaspoon ground cinnamon, ½ teaspoon each grated nutmeg, ground clovers, and c. soda, 2 teaspoons baking powder, add ½ cup chopped dates and ½ raisins. Drop in teaspoonfuls on greased baking slide. *Parkin Biscuits*: 4ozs. flour, 4ozs. oatmeal, 2ozs. lard, pinch of salt, one flat teaspoon baking powder, 1 of mixed spice, 2 tablespoons brown sugar, 2 tablespoons of treacle, almond kernels. Sift the flour with the salt and baking powder and spice, then add the oatmeal. Put the sugar, lard, and treacle into a saucepan and heat slowly until melted. Stir in dry ingredients and mix well. Take small pieces and form into balls, put ½ an almond kernel on each, bake until crisp and firm—about 15 minutes. *Coffee Kisses*: 4ozs. butter, ½lb. S.R. flour, 3ozs. castor sugar, 1 egg, 1 tablespoon coffee essence, pinch of salt. Beat butter and sugar to a cream, add coffee essence. Sieve flour and salt, beat egg, add flour and egg alternately to the mixture. Place two together with filling: 3ozs. icing sugar beaten well together with 1½ozs. melted butter and 1 teaspoon coffee essence. Dust with icing sugar.

RENDELSHAM.

July 4th.—Attendance, 12.

KNITTING HINTS.—Paper read by Miss P. Foster:—"To knit a garment and make a success of it good wool is essential; it is lighter and goes further than cheap wool, A good light wool is preferable for all babies' clothes, underwear, and light summer jumpers (I prefer Patons 2-ply for these), but for a warmer jumper 3- or 4-ply wool will be found more suitable. For socks that have to stand hard wear, choose a good heavy wool. Never wind wool tightly, it destroys the elasticity and lustre. After having cast on stitches, if a firm edge is required knit into the back of the stitches for the first row. Do not knit too tightly, or when the article is washed it will shrink quickly, just keep the stitches on the needle to allow them to slide easily. Always knit to the end of a row before putting work away. Some knitters leave off in the middle of a row in order to fold the needles with the work, but this has a tendency to show unevenness in the finished article. Do not run needle in and out of work. Cast off stitches on wrong side of work. This makes a firmer edge." (Acting Secretary, Miss P. Foster.)

SADDLEWORTH (Average annual rainfall, 19.61in.).

June 5th.—Attendance, 9.

BUTTER MAKING.—Paper read by Mrs. Vogt:—"The cows should be given good stall feeding in addition to pasture. They should be fed morning and night, bran with chaff prevents butter being tainted by weeds and imparts a good flavour. All dairy utensils must be kept carefully clean with soda washes (not too hot) and rinsed in scalding water. A sunbath for separator, milk buckets, cream cans, and churn—after being washed—is an excellent germ killer and sweetener. Care must be observed to cool cream quickly after each separating, and never to mix warm cream with cold. All cream should be cool; under a draughty verandah is ideal for the winter and summer nights. It is most necessary to prevent the rays of the sun from striking cans containing cream. Cream should be made into butter while fresh—allowing for weather conditions—three or four times a week. Fairly thick cream gives best results. Put salt with cream into churn, 1lb. of salt to every 10lbs. of butter—of course, salting is a matter of taste—work it until it reaches the crumbly stage, add 1gall. or so of cold water, never warm, work again until butter milk runs off the shiny surfaces of the solid mass of butter. Pour off the butter milk and pour cold water on the butter, pressing and stirring well. Strain off the milky water, repeat until water pours off clear. If milky particles are left butter will be streaky and will not keep well. Leave butter stand 12 hours. Press out all the water. The butter is then weighed into pounds, pressed well into shape, and neatly covered with butter paper. Allow 1oz. to every pound of butter for shrinkage. An easy way to cover butter with paper smoothly is to dip butter papers in cold water before wrapping."

REARING OF CALVES AND A FEW POINTS ON DAIRYING.—Paper by Miss D. Coleman:—"*Care of the Calf*: The calf is usually able to stand soon after birth and able to drink from its mother, the best practice is to leave it with its mother for about 24 hours, the calf should then have the colostrum—the first of its mother's milk. *Calf Housing*: The sheds should be warm and dry and yet open to receive sun and fresh air. I

prefer to keep a calf by itself until able to drink from a bucket, which should be within a few days. In a week, calves enjoy a run in a small yard or pasture paddock. *Cleanliness is Essential:* All sheds and yards should be cleaned regularly, kept limed and clean-bedded, and feeding buckets washed. Scours, the most common disease with calves, is generally caused by uncleanliness or cold or overfed with milk. An efficient remedy for a severe attack of scours is 1 beaten egg in a little warm milk, 1 may be enough, if not, repeat 12-hourly until the calf is better, no other milk should be given. Calves with this complaint should be kept by themselves or other calves may develop it. *Feeding:* Milk fed to calves should be heated to 98° F. It is much better to give a calf a little milk often than a lot at once. 6lbs. to 9lbs. daily for the first week and then increase gradually; 15lbs. a day is enough for a Jersey calf, other breeds with bigger calves could take more. Feed for about 3 weeks on whole milk—its own mother's for preference—and then gradually change to separator. At 3 to 4 weeks a calf will eat grain, chaff, and hay; feed a little in a box, also they will take a salt lick, which helps to keep them healthy; equal parts of salt and bonemeal or salt and super. At 3 to 4 months the calves are old enough to go out into a paddock if good pasture is available. If milk is plentiful, feed calves once a day with 1gall. of milk until about 5 months old. If possible, handle the calves to quieten them, and they will be easier to handle later. *A Few Hints on Dairying:* To receive the best from the cows, handle kindly and quietly, milk regularly, and always strip dry, give a change of paddock and feed when possible and always provide plenty of fresh drinking water. The two most common diseases are milk fever and mammitis. The usual practice for milk fever is to inflate the udder with air, and this way the cow should be on her feet in a few hours. Mammitis is a disease in the udder, and the germs seem to be always present. Always be careful that the udder and the milker's hands are clean. If there is ever any inflammation this treatment is very satisfactory—Bathe with hot water which contains disinfectant, rub well to dry it, and then rub well into the udder equal parts of olive oil and kerosene, and strip the quarters dry. Cows should have shelter, especially in this district, from cold east winds." (Secretary, Miss G. Frost.)

1934 CALENDAR 1934

MAY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	●	30	31	..	..
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	●	28	29	30
...	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	...	...	...	...	...	...
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	●	27	28
29	30	31	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	●
26	27	28	29	30	31	...
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
●	24	25	26	27	28	29
30	...	...	...	...	...	...

OCTOBER

S	M	T	W	T		S
...		2	3	4	5	6
7		9	10	11	12	13
14	15	16	17	18	19	20
21	22	●	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	●	22	23	24
25	26	27	28	29	30	...
...	...	...	...	...	...	...

DECEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	●	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

WILLIAMSTOWN (Average annual rainfall, 27.77in.).

June 6th.—Attendance, 6.

STOCKING THE MEDICINE CUPBOARD.—Mrs. Hill read the following paper:—"A few simple remedies needed to-day for first aid take up very little room, for they can all be bought ready made and only need a cupboard with a lock and key and a tin for storing a few dressings. The contents of the cupboard should be clearly labelled and any which are of a poisonous nature should have a label to that effect. Have a list of the contents pasted on the inside of the door so that no time is lost looking for something which is not there, and in case of an accident it is not easy to think just what you have in stock. When the last of any of the medicines, &c., is used, obtain a fresh supply before it is forgotten or it is sure to be the very thing that will be needed next. Tincture of iodine is such a substance, and it should be the routine treatment in every home that any cuts, scratches, splinters, or if a nail is trodden on and pierces the flesh, should have a dab of iodine at once. If the skin is broken a bandage is advisable to keep out the dirt and germs. Kerosene is also useful towards preventing any septic condition. Peroxide diluted with water makes an excellent mouthwash, and is also antiseptic for cuts or wounds. Lysol made into a weak solution should be used for washing the thermometer in all cases of sickness, more particularly in contagious diseases. Boracic crystals make an excellent eye lotion and are more easily dissolved than the powder. Castor oil, olive oil, and eucalyptus should all have a place in the chest, as they are all needed in case of colds in the head. Friar's balsam used as an inhalation —1 teaspoon to 1 pint of boiling water—is splendid for a cold on the chest. Ammoniated tincture of quinine often checks a cold. Brandy is also necessary; it is one of the quickest cures used as a gargle for a sore throat and is also handy in cases of fainting. Aspirin tablets should not be taken on the slightest provocation, as the drug from which they are made is a strong one, but it is better to take two aspirin tablets than be racked with a headache. Carbonate of soda is splendid for hot foments; 1 teaspoon to 1 pint of boiling water I found it most effective in a case of severe sunburn when the legs were badly burned and swollen. Epsom salts, seidlitz powders, and cascara tablets, should all be included in the chest. A lemon squeezed into a cup of black coffee will often cure a bilious attack and is worth trying." (Secretary, Mrs. A. Cundy.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Gladstone	21/8/34	54	Exhibition of Home Crafts	Mrs. L. Sargent
Gladstone	18/9/34	28	Social Afternoon	Mrs. L. Sargent
Pinnaroo	3/8/34	36	Demonstration—"Pastry Making," Mrs. H. Fewings	Mrs. F. Atze
Kybybolite	31/7/34	24	Annual Meeting	Mrs. W. Kekwick
O'Loughlin	23/8/34	11	Papers from *Journal*	Mrs. E. P. Pfeiffer
Parrakie	28/8/34	13	Papers	Miss J. Halliday
Auburn	31/8/34	23	Annual Meeting	Miss L. Dennison
Goode	18/7/34	12	"Rug Making," Mrs. Klau	Miss Lange
Tantanoola	5/9/34	12	"First Aid," Miss J. Telfer	Mrs. E. Telfer
McLaren Flat	6/9/34	34	Social Afternoon	Miss I. Nicolle
Wepowie	31/8/34	49	Address—Miss Campbell	Miss Roocke
Eurelia	15/9/34	11	Annual Meeting	Miss M. Stott
Wilmington	13/9/34	56	"Rug Making," Mrs. E. Orchard	Mrs. L. Cole
Penola	5/9/34	58	"Rug Making," Mrs. F. Lynn	Mrs. E. Kidman
Snowtown	6/9/34	19	"Home Nursing," Sister Kenihan	Mrs. A. Hocking
Saddleworth	11/9/34	27	Address—Dr. E. Hillier	Miss G. Frost
Balhannah	19/9/34	17	Paper—Mrs. R. James	Miss D. Spoehr
Balhannah	26/9/34	19	Discussion	Miss D. Spoehr
Mundalla	20/9/34	10	Annual Meeting	Miss M. Fisher

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. NOVEMBER, 1934. No. 4.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

River Murray Swamp Areas, at Murray Bridge (Jervois Branch), Thursday, February 21st (F. P. Baily, Woods Point, Secretary).

Mid-North, at Redhill, Thursday, March 14th (S. A. Pengilly, Secretary).

South-East (Upper), at Mundalla, Wednesday, March 20th (A. Ross, Secretary).

South-East (Lower), at Mount Gambier, Wednesday, April 10th (G. T. Gurry), Secretary).

River Murray, at Moorook, Thursday, June 20th (S. Perkins, Secretary).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Trade with India.

The Department of Commerce has drawn attention to statistics which reveal the fact that Australia's export trade to India is steadily declining. The position may be summarised briefly to the effect that, whilst India is continuing to find an increasing market for her goods in Australia, she is buying less and less of Australia's products each year, and in consequence the adverse trade balance against Australia is steadily mounting. If, with the decline in total exports, there were a decline in practically all the commodities which go to make up that total export trade, the search for the cause would be simplified; but it is found that in many of the commodities which we export our trade has actually improved. A comprehensive statement is drawn up setting out the commodities which show an increase in the export trade to India and those showing a decrease. Amongst the former are cheese, milk and cream, fodders, dried fruits, fresh fruits, canned fruits, flour, jams, other vegetable foodstuffs, wine, other alcoholic liquors, animals (other than horses), and wool. Some of the commodities showing a decrease are butter, bacon and ham, meat, other animal foodstuffs, preserved meats, fruit juices, wheat, ales and horses.

One of the difficulties which is being quoted by exporters generally is the fact that the ports of Madras, Calcutta, and Rangoon, which are the spearheads of large areas of consumption, are not in direct communication with Australia. Transhipment at either Colombo or Singapore adds to the landed cost of the goods at the ports mentioned. In the case of refrigerated cargo the transhipment difficulty is the big hindrance to trade progress from Australia, and furthermore the extra handling and storage whilst awaiting the on-carrying steamer leaves the goods open to pilferage and deterioration as well as to many other difficulties.

United Kingdom exporters enjoy certain tariff preferences in India over Australian exporters, but as Australia is continuing to buy and is even increasing her purchases of Indian goods, we certainly have a good basis to any case which might be presented to the Indian Government for an extension of those preferences to Australia.

Included in the statistics are comments regarding the States of the Commonwealth supplying the Australian trade in the commodities quoted. The eastern States supply most of the Australian commodities and South Australia appears only to be mentioned in its trade in wine of which our exports to India in 1932-33 were 1,162galls. of a total imports to India of 165,370galls. Our trade for that year was, however, over 100 per cent. greater than for the previous year.

Rickets in Pigs.

The Secretary of the Stockport Branch of the Agricultural Bureau reports that several members of the branch have young pigs with mis-shaped joints and unable to stand. Mr. A. H. Robin, B.V.Sc., of the Stock and Brands Department says the

trouble undoubtedly appears to be rickets. This disease is caused through an insufficiency of minerals, particularly calcium (or lime). To prevent its occurrence, the young pigs—from weaning onwards—should be given at least ½gall. of separated or skim milk per head daily. Failing this, they should be supplied with the following mineral supplement mixture:—Agricultural (or air-slaked) lime, 2 parts, common salt, ½ part. This mixture should be added to the diet at the rate of 2½ per cent. of concentrates fed. The pigs should also be given a daily run on green pasture or a daily allowance of fresh cut green feed in the ration. Affected animals should be placed in clean warm sties, where they can be well exposed to direct sunlight and in addition to feeding them on a diet of cereals, milk (or mineral supplement) and green feed, they should be given each 1 teaspoon of cod liver oil (of guaranteed quality) twice daily.

Important Notice to Stockowners.—Cancellation of Registered Brands and Marks.

The Registrar of Brands (Mr. H. O. Laurenti) desires to remind stockowners that in order to retain their existing brands they must apply to the Registrar of Brands, Adelaide, setting out full particulars as to name and address, Hundred in which the brands are being used, and particulars of all the brands and marks registered in their names. There is no fee charged for the retention of the brands, but persons requiring an acknowledgment from the Registrar must enclose a stamped addressed envelope. The reason for giving this special reminder is that the time expires on the 31st of December, 1934, and should any person fail to apply by that time the brands registered in his or her name will be cancelled. Readers are requested to acquaint others of the above notification.

Ensilage and Grass Hay Competitions, 1934.

The South Australian committee of the Australian Dairy Council, in conjunction with the Department of Agriculture, is again promoting Ensilage and Grass Hay Competitions amongst the dairymen in this State. Dairymen are urged to enter for these Competitions, as it is the spirit of healthy competition which improves the standard of our primary products. The improvement of the pastures of the State means the improvement of our dairy herds and the produce therefrom. Entries are invited from dairy farmers in two districts, namely, Hills and South-Eastern, and are restricted to those dairymen who are milking not less than seven cows. Trophies and certificates are to be awarded in each of the four competitions, and successful competitors will receive prizes as under:—First, £3 3s. and certificate; second, £2 2s. and certificate; third, £1 1s. and certificate. Entries will close on January 5th, 1935, and the entrance fee is one shilling. Entry forms and further particulars regarding these Competitions may be obtained from the Secretary, c/o Office of Minister of Agriculture, Flinders Street, Adelaide.

Fat Lambs for the Williamstown District.

Replying to a subscriber to the *Journal of Agriculture*, who asked what is the best cross for fat lambs for the Williamstown district, Mr. W. J. Spafford (Deputy Director of Agriculture) says large-framed Corriedale ewes, or well-grown Comeback ewes, mated to Southdown rams would produce fat lambs of the very best quality at Williamstown, and the ewes would cut a fairly heavy fleece of high value in that district. To produce fat lambs from Merino ewes the Southdown will probably prove the best breed of sire to use, producing a high percentage of lambs, all of which will become marketable, and with the minimum of lambing trouble, even if the Merino ewes are on the small side. If the pastures have been regularly top-dressed, and particularly if Subterranean Clover is established on an extensive scale, maximum results will probably be obtained from fat-lamb breeding activities if the lambs are dropped early in September. Mating in autumn leads to a much greater percentage of lambs, less lambing trouble, certain green feed for the ewes at lambing time, and a good market for high-class lambs around December, and a little later.

THE CLAIM OF MEN ON THE LAND UPON THE PEOPLE OF AUSTRALIA.

(A National Broadcast Talk delivered on October 18th, 1934, through 5 CL, Adelaide).

[By ARTHUR J. PERKINS, Director of Agriculture.]

The celebration of Victoria's Centenary comes appropriately enough to remind us that the White Race has now been in occupation of the Fifth Continent for more than one hundred years; but it needs a glance extending even further backwards to make us realise that 145 years ago the first crop of Wheat ever grown in Australia was being harvested at Parramatta in 1789; that is to say, that the first Wheat Crop of Australia was contemporaneous of the sack of the Bastille and the outbreak of the French Revolution. Eight years later, in 1797, Merino Sheep from the Cape of Good Hope were first introduced into New South Wales. And it is upon these two corner stones—Wheat and Wool—around which in due course other rural undertakings and mining came gradually to cluster, that has in the main been progressively erected the imposing superstructure of the present-day National Wealth of the Commonwealth. May I state here that I realise to the full the inappropriateness, and indeed the usual futility of an array of figures in Broadcasted Addresses; and I am well resolved to-night to give figures as wide a berth as circumstances permit. Hence, I regret the necessity of having to support these opening remarks with a few numerical data.

The Commonwealth Statistician has estimated that the *private* wealth of Australia at June 30th, 1929, exceeded 3,351 millions sterling, and corresponded to £526 per head of population; but in this huge sum has not been included communal Wealth vested in the property of Commonwealth and State Governments and of Local Governing Bodies. By way of contrast it should be noted that 116 years earlier, in 1813, it was estimated that the Private Wealth of Australia did not exceed one million sterling, or £75 per head of population only.

If I have stated that this National Wealth of ours rested upon a solid foundation of primary production, I did not mean to infer that primary production was the exclusive source from which our Wealth had been derived; something we undoubtedly owed to our Captains of Industry and to the thews and sinews of a rapidly expanding industrial population; but since hitherto we have been unable to export more than 3 per cent. of our manufactured commodities, to no appreciably greater extent than the relatively modest personal requirements of six and a half million people. Contrast this figure with our normal export of nearly one-half of the Primary Products raised in Australia; from this aspect alone the importance of Primary Production to the community should be apparent. Nor should the auxiliary role played by Capital borrowed from abroad be overlooked; it is this money which in our impecunious past had rendered possible the progressive opening up and development of new country, the building and equipment of harbours and railroads, the construction of roads and bridges, adequate provision for water requirements of a rapidly expanding population, and many other items that are inseparable from the settlement of virgin country, and bringing it into profit. Hence, it would probably be no exaggeration to say that had it not been for the services rendered in the past by the Capital corresponding to our External Debt of 600 millions sterling, we should probably to-day be no further advanced from the political or economic standpoint than were our fathers towards the middle of last century.

This brings us to the second role which primary production has been called upon to play in the Commonwealth. Its first role has been shown to be the progressive building-up of wealth; and the second is now seen to be the provision of the medium by means of which alone can be paid interest due on money borrowed abroad in the main for the development, and more recently, for the defence, of Australia; and occasionally perhaps for less commendable purposes. Such interest, of course, can be met by the transfer of gold abroad; but the amount of precious metal available at any given time is not inexhaustible; and eventually most of the interest due has been liquidated from credit created abroad by the sale of exportable home commodities. And since the value of Exported Primary Products is usually represented by 97 per cent. of the value of Total Exports, whilst that of exported manufactured commodities does not exceed 3 per cent., the value of Primary Production to the community in this direction cannot be over-stated.

In the circumstances that have been indicated one would have imagined that Primary Production would have occupied a major position in the thoughts and actions of the people of Australia; that nothing would have been done to disturb the rhythm of its progress, but rather that everything would have been done to intensify its output and well-being. And such indeed appeared to be our general mental attitude some thirty or forty years ago; we were in those days still nationally conscious of our dependence upon the men on the Land, and our thoughts and actions were coloured accordingly. But a subtle change has crept over our outlook during the past thirty odd years; we are no longer *Colonists*, but independent nationals of a vast but thinly populated Continent; and if in our midst a few Colonists should still survive they will surely be found among those lonely individuals who invade our Metropolitan Areas at Show Time; of whose scheme of life we know little, and care less, so long as they meekly supply the foodstuffs we require, and the pressing export needs of our national economy. It is surely significant that even candidates for country Parliamentary honours no longer think it necessary to remind their prospective constituents that the latter are the backbone of the State. The fact of the matter is that as a community we have to all intents and purposes lost the pioneering or frontier spirit; we have become overwhelmingly urbanised, and are in danger of adopting the traditional procedure of living upon the country rather than for the country. I suggest that self-interest, if no higher motive, should cause us to pause and consider whether our individual welfare, and that of the community of which we form part, is not dependent upon the technical and financial success of the Men on the Land; and if so much be granted, whether our national economic structure would not be in danger of complete collapse if, through no fault of their own, nor of their immediate environment, these Men on the Land should eventually be driven off their holdings. And in such circumstances, what should we think of our personal responsibilities when we came to realise that this calamity, should it eventuate, would be no more than the natural consequence of that mistaken policy which, during the past thirty years or so, has sought to force industrial self-sufficiency upon a country hardly yet emerged from virgin wilderness, and wholly dependent upon primary production for its solvency.

Briefly speaking, the position may perhaps best be summarised as follows:—Primary Production is compelled to sell its commodities upon the Markets of the World, or to accept for them export parity on a limited home market; that is to say, usually in the cheapest markets. Hence it follows that for business success its necessary purchases should also be made in the cheapest markets, or else certain failure must ensue. And this unfortunately is what has been happening to our Primary Producers who have been compelled to sell in the cheapest market, but to buy on a highly protected home market, the dearness of which has been progressively rising from the earliest days of Federation. And this sad abnegation

of all sound business principles can have but one eventual end—and that an end that no other policy could compass—namely, the progressive "starving off the land" of primary producers.

Nevertheless, notwithstanding the manifest absurdity of our national policy when brought to bear upon our natural conditions, I recognise that not without considerable hurt to the body politic would it be possible to pass abruptly from extreme protectionism to that freedom of trade under which alone Primary Production can be expected to thrive. But with the possible exception of what might be considered to be "key" or "national" industries, there is little to hinder progressive scaling down of most of our tariff charges to a reasonable basis of revenue production, which after all was the original function of all tariffs. Nor in this connection might it even be necessary to give special consideration to these so-called "national" industries; for it does not necessarily follow that present inability to meet overseas competition on even terms will hold good after the tariff barriers have been lowered, and slumbering local industries whipped into undreamt efficiency by keen overseas competition. Many industries, no doubt, will ultimately give way before more efficient competitors; but the community as a whole will benefit from the change. Others, again, in the opinion of many competent observers, will not only be able to retain their hold of the home market, but, in addition, will so improve their technique as ultimately to be able to meet successfully the competition of allcomers on the accessible markets of the World.

The ultimate re-actions that may be anticipated from a policy of this kind may be summarised as follows:—Progressive improvement in the quality of manufactured articles placed on the Australian market, coupled with progressive decline in prices; corresponding reduction in cost of living, to which, again, would correspond reduction in costs of production of all efficient secondary industries in the first place, and ultimately in all forms of primary production as well; and this, I take it, is the goal that every country largely dependent upon primary production should ever keep steadily in view. True, such a policy would probably lead to a reduction in the apparent value of Wages paid, but this reduction would have been more than met by prior reduction in the cost of Living and by increased purchasing power of the Wages earned.

But the full benefits of such a policy would not become apparent until the lapse of several years; and, moreover, although in my opinion it is the only policy that adapts itself logically to the economic conditions of a country such as Australia, it has not hitherto found favour in the eyes of those able to dictate in such matters; nor does it appear likely to do so in the near future. And in the meanwhile the Man on the Land goes on from precarious year to precarious year, and manages to retain a grip of his holding by reducing his standard of living to a vanishing minimum, and by the compulsory grace of his creditors.

In the meanwhile, therefore, something must be done if we wish to forestall a regrettable catastrophe; and because I believe that in this country, above the political machine, above the press, above all sectional combinations, *Public Opinion* is still supreme, I make special appeal to the Man in the Street on behalf of the Man on the Land; not because he is "the backbone of the State," not because he is the prime builder of our national wealth and we cannot do without him, but because in the majority of cases he finds himself in distress, which was not caused but intensified by four seasons of low World prices; nor can he be helped out of his difficulties except by the grace and goodwill of the people.

Such assistance as has hitherto been given to Rural Industries has usually taken the shape of grants-in-aid or Bounties, with the striking exception of Dried Fruit, and more recently, but temporarily only, of Dairy Products. The chief objection to the former when applied to old and well-established national industries is that they savour too much of patronage and charity. It may be well enough for insecure Iron and Steel Industries not to boggle at Bounties, even from behind the

efficiency of high tariff walls, but when doled out to Wheat they seem to confer dignity neither upon the donor nor the recipient. The fact that should in this connection be kept clearly in our minds is that had it not been for Federal obsession over high tariffs, the abnormally high costs of production that have critically hampered rural producers of recent years would not have obtained, and not even recent World prices would have been considered wholly unremunerative; hence it would be no more than seemly that whatever assistance were given should come as a matter of natural right, rather than in the form of a dole, however weighty. The difficulty, no doubt, will be how to devise means leading to results that would prove acceptable to all concerned; but if none were forthcoming, we might perforce have to swallow our pride, and accept the dole, however distasteful.

One suggestion, however, may perhaps be made, not because of its originality, since it has frequently been debated in country circles, but because of its simplicity and apparent logicalness. It is to the effect that so long as a sheltered home market, and corresponding home prices, were provided in Australia for secondary industries, with their consequential influence on the costs of production of Primary Industries, it is no more than logically just that corresponding home prices should be allowed for such portion of our rural products as are consumed within Australia. If such be granted, then the relatively high home prices and the relatively low World parity prices would in combination supply Australian Rural Producers with mean prices approaching costs of production more effectively than has latterly been the case; provided that adequate provision were made for equalisation between States with heavy export and low consumption percentages on the one hand, and States with low export and high consumption percentages on the other. An arrangement of this kind has been in force for the Dried Fruit Industry since 1924, and may be said to have rendered possible at a critical moment in our rural history the progressive but effective development of a

remunerative export trade, and to have saved thousands of pounds invested in our River Colonies. Quite recently, too, the same principle has been extended to the marketing of Butter and Cheese, but for one year only; and it is hoped that it will do much towards extricating our Dairymen from a perilous economic position.

I do not suggest that this proposed manipulation of price values in defiance of the Law of Supply and Demand offers an ideal solution of our problem; nevertheless, in a World and in a Period in which "national self-sufficiency" in everything seems to be the only principle upon which all Nations appear to be in complete agreement, I can see no alternative, or perhaps none better. During 34 years of Federation we have shown grim determination to exact from our citizens prices considerably above export parity values for the unexportable output of our factories; we have chosen, too, to shut our eyes to the crippling influence of such a policy upon rural production in general; and now that rural production can no longer make ends meet on the basis of export parity prices for its output, we cannot, in common fairness, refuse to that fractional portion of rural production that is consumed at home the same consideration which we have been extending to the unexportable output of our factories for the past 34 years.

True, it will be said that to raise the cost of Foodstuffs would have the effect of raising the cost of Living, and this, no doubt, is true; but so does every single tariff charge on the Statute Book, and to the latter no exception appears to have been taken; that these enhanced home prices would be felt most severely by the poorer classes of the community; and this, too, would be true but for the fact that the machinery of our Courts of Justice watches over the welfare of those in receipt of minimum basic or award wages which are made to fluctuate with corresponding aggregate fluctuations of the necessaries of Life, of which Foodstuffs obviously form a large part.

But it is obvious that should inclusive Legislation on these lines ever be contemplated, opposition of the bitterest kind may have to be overcome; and, as in all such matters, the final decision will rest with instructed Public Opinion. Hence, I make a final appeal to the Man in the Street, to consumers generally, and in particular to thrifty Housewives, upon whom the burden of keeping the larder replenished necessarily falls. To these I would say:—

> Would you feel comfortable if you knew that the garments you purchased were the products of unregulated sweated Labor? And, if not, is there any moral difference between the prices paid for the products of unregulated sweated Labor on the one hand, and prices paid for Butter, Milk, Wheat, &c., which do not bring in sufficient money to pay for the cost of producing these Commodities, on the other hand? And, finally, is it morally indefensible to sweat the cottage worker, or to under-pay factory hands, but permissible to sweat the rural worker?

I do not propose saying more than that; the replies to these questions must be left to the consciences and common-sense of the people of Australia.

In conclusion, I shall state that I have tried to show that the Men on the Land had a strong moral claim upon the People of Australia, in the first place because they were responsible for national work of first-rate importance, and in the second, because indirectly the National Policy of Australia had raised the costs of Production of Rural undertakings beyond the profit limit. These undertakings are exceedingly varied, and it would not therefore be possible to assess this claim in actual figures. This much, however, can be said for average conditions:—

The combined money value of saleable Farm Products, after meeting Costs of Production, including home and hired labor, apart from that of the owner, necessary purchases, rates and taxes, interest and depreciation, should leave a Balance sufficient to yield to the owner a Labor Income equivalent to not less than the wages of a skilled artisan.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

FORTY-FIFTH ANNUAL CONGRESS.

OPENED BY THE GOVERNOR.

The 45th Annual Congress was held in the Way Hall, Adelaide, on Monday, Tuesday, and Wednesday, October 8th, 9th, and 10th.

DELEGATES.

The following branches appointed delegates, and the figures indicate the number of sessions for which attendances of delegates were recorded:—*Adelaide*—J. Y. Hudd (2), J. R. Newland (5). *Alawoona.*—W. Paull (3), A. J. Pengilly (5). *Allandale East*—F. W. Thompson (4), R. T. Laslett (5). *Angaston*—W. Giles (1), W. Sibley (2). *Arthurton*—D. Noble (3), P. Ford (3). *Balaklava*—A. F. Smart (6), H. Wills (4). *Balhannah*—H. Rollbusch (5), R. James (1). *Balumbah*—A. A. Jericho (5), S. G. Jericho (4). *Beetaloo Valley*—P. Curtin (0), B. W. Giddings (4). *Berri*—E. J. Johnson (4), A. G. Jarvis (2). *Black Springs*—J. M. Howard (4), B. Heinrich (5). *Blackwood*—J. Turner (1), H. Goldsack (1). *Blyth*—H. E. Zweck (4). *Booborowie*—A. T. Fairchild (6), W. Kain (3). *Boolgun*—N. Koehne (0). *Boor's Plains*—T. Rodda (3), A. N. Reid (2). *Borrika*—R. G. Bonython (4), H. Griffiths (0). *Brownlow*—N. Woithe (0), A. Steinborner (0). *Buchanan*—W. G. Hucks (0), F. C. Rohde (4). *Bute*—E. H. Ebsary (5), T. Trengove (2). *Butler*—N. G. Stewart (0), G. H. Turner (0). *Calca*—P. C. Roberts (4), J. Harris (3). *Caliph*—W. H. Todd (3). *Chandada*—J. Travers (4), R. J. Mudge (3). *Chilpuddie Rock*—H. Frost (0), F. Herde (4). *Clarendon*—M. Harper (0), T. B. Brooks (3). *Coomandook*—F. E. Ballard (5), W. R. Trestrail (3). *Coonawarra*—W. L. Redman (3), E. G. Allder (5). *Cummins*—M. A. Palm (5), K. A. Trigg (5). *Cungena*—A. Voumard (0), C. Ayliffe (4). *Echunga*—C. B. Symon (4), L. W. Sando (3). *Eurelia*—M. T. Wall (3). *Finnis*—M. Llewellyn (0). *Frayville*—E. Hein (3), V. H. Dohnt (0). *Gladstone*—G. M. Black (5), L. G. Sargent (4). *Goode*—E. H. Fear (5), J. Kelly (6). *Greenock*—C. M. Roenfeldt (5). *Hanson*—W. Woolacott (5), F. Turner (6). *Inman Valley*—A. M. Fuller (0), H. V. Lewis (0). *Jervois*—M. Wilkin (6), W. Gale (0). *Kalangadoo*—H. V. Dowdell (0), R. G. Messenger (0). *Kanni*—C. Schulze (4), A. J. Pobke (4). *Keith*—A. M. Densley (4), L. H. Densley (4). *Kelly*—J. F. Hannan (4), J. W. Parsons (2). *Ki Ki*—R. C. Cooley (3), W. Goodall (5). *Kilkerran*—E. T. Koch (6). *Koolunga*—A. Buchanan (0), J. W. Sykes (0). *Koonunga*—C. B. Mibus (4), B. J. Mickan (4). *Koppio*—B. Low (0), R. Richardson (4). *Kyancutta*—F. E. Daniel (5), R. J Holman (5). *Kybybolite*—J. D. McAuliffe (3). *Lameroo*—E. A. Blake (4), A. G. Potter (0). *Laura*—L. Mudge (2), E. Klemm (0). *Laura Bay*—P. S. Morrison (5), W. Bowell (3). *Light's Pass*—B. Boehm (4), A. J. Summers (4). *Lone Pine*—F. Fromm (5), S. Turnbull (5). *Lyndoch*—E. Evans (4). *MacGillivray*—J. N. Wood (3). *Mangalo*—D. Munday (3), W. Munday (3). *Marama*—A. Rogers (5), T. Hinkley (5). *McLaren Flat*—W. Mobsby (3), P. T. Wait (0). *Millicent*—C. G. Skeer (4), G. Major (4). *Miltalie*—H. R. Jacobs (1), G. E. Smith (0). *Minnipa*—D. Kitto (3), H. E. Broad (3). *Monarto South*—E. Rolland (4), O. Aesche (0). *Moorlands*—A. Mann (5), A. E. Stock (5). *Moorook*—S. Perkins (4), S. Loxton (3). *Morchard*—A. McCallum (4), E. Tilbrook (3). *Mount Barker*—L. Frame (0), H. Hunt (2). *Mount Bryan*—J. R. Simpson (4), H. H. Edwards (3). *Mount Gambier*—A. C. McMillan (5), E. W. Tollner (6). *Mount Hope*—W. F. Vigar (4), J. L. Vigar (4). *Mudamuckla*—A. R. Maguire (5), W. H. Watson (3). *Mundalla*—L. M. Dinning (5). *Murray Bridge*—H. B. Kuchel (2), A. Wells (4). *Murraytown*—

A. J. Clogg (3). *Mypolonga*—P. H. Pickering (0), T. J. Dodd (2), *Nantawarra*—W. Hamdorf (1), T. Dixon (1). *Narridy*—E. W. Richards (4), J. M. Klingner (4). *Nelshaby*—H. Williams (6). *Nunjikompita*—R. Dunn (0). *Nunkeri*—P. J. Oster (1), S. Yelland (0). *O'Loughlin*—C. Bergmann (4), E. Lutz (5). *Overland Corner*—L. Atkinson (0). *Palabie*—G. S. Rashleigh (5), S. H. Rashleigh (5). *Parilla*—A. W. Weldon (4), L. J. Foale (6). *Parilla Well*—E. C. Slater (4), D. Wurfel (5). *Parrakie*—A. Afford (3), G. Hamilton (4). *Paskeville*—S. Pontifex (4), C. K. Stephenson (4). *Penola*—S. Warner (4), F. Hinze (6). *Penwortham*—W. H. Penna (5), J. H. Richardson (5). *Petina*—G. J. Prescott (5), T. L. Schulz (4). *Pinbong*—H. B. Scholz (4), E. M. Scholz (4). *Pinkawillinie*—W. G. Miller (4), S. C. Johnson (0). *Pinnaroo*—A. Gilbert (5), C. H. Ross (6). *Pygery*—W. M. Heath (4), J. Kammermann (0). *Ramco*—G. Watkins (6). *Redhill*—J. V. Dundon (5), H. J. Crouch (0). *Rendelsham*—F. Todd (4), E. Sly (4). *Renmark*—M. B. Geneste (5). *Riverton*—D. C. Hannaford (0), O. E. Longbottom (0). *Roberts and Verran*—S. Barber (6). *Rosedale*—A. H. Wolf (3). *Roseworthy*—J. Dridan (1), J. Carmichael (2). *Saddleworth*—T. Vogt (2), F. W. Coleman (4). *Shoal Bay*—G. Barrett (4), A. Nash (0). *Snowtown*—A. E. Dolling (5), G. T. Freebairn (4). *Stanley Flat*—W. Slattery (4), M. Lee (4). *Stockport*—F. Watts (3). *Strathalbyn*—F. W. Allison (3). *Streaky Bay*—A. W. Cook (0). *Sutherlands*—V. H. Weiss (6), E. Twartz (6). *Tantanoola*—M. Telfer (5), G. H. Bird (4). *Taplan*—W. J. Hammond (4), P. R. Hodge (4). *Taragoro*—J. Crooks (4), E. James (3). *Tarlee*—D. G. Kelly (1), E. T. Clarke (0). *Tatiara*—L. H. Butler (5), F. B. Milne (5). *Tintinara*—H. Bridle (0), E. Bower (4). *Truro*—W. Rice (0), F. Collins (0). *Upper Wakefield*—F. W. Gregor (0), C. Webb (3). *Virginia*—A. Hatcher (6), W. S. King (0). *Wandearah*—W. C. Slater (5), L. C. Crouch (3). *Warcowie*—F. Williams (0), M. Ryan (5). *Warramboo*—F. Chilman (4), J. F. Sampson (3). *Wasleys*—E. Fischer (1). *Watervale*—G. Holder (3), G. W. Baillie (3). *Weavers*—E. H. Giles (3), H. W. Cornish (2). *Wepowie*—H. W. Noske (5), W. G. McGurke (0). *Willowie*—L. K. Wood (4), L. T. Crisp (5). *Wilmington*—P. C. Cole (3), H. H. Carter (5). *Wirrabara*—A. B. Curtis (0), P. Banfield (3). *Wirrilla*—H. Schunke (3). *Wolseley*—M. H. Pilgrim (6), A. J. Grosser (6). *Wudinna*—D. Duguid (5), A. J. Byrne (4). *Yaninee*—W. R. Mitchell (0). *Yantanabie*—N. B. Miller (3). *Yeelanna*—A. L. Carslake (4), J. H. Haarsma (6). *Yurgo*—R. W. Jarrett (6), E. H. Easton (1). *Yundi*—C. Jones (3), G. Lomax (3).

OPENING SESSION.

Congress was opened on Monday evening by His Excellency the Governor, Sir Winston Dugan, K.C.M.G., C.B., D.S.O. Mr. A. J. Cooke (Chairman of the Advisory Board) presided, and there were also present on the platform:—Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), Messrs. F. Coleman, J. B. Murdoch, P. J. Baily, H. N. Wicks, A. J. A. Koch (Members Advisory Board of Agriculture), Professor A. J. Perkins, Messrs. W. J. Spafford, G. Quinn, C. F. Anderson, and R. L. Griffiths (Department of Agriculture), Drs. A. E. V. Richardson and J. Davidson (Waite Research Institute), A. R. Callaghan (Roseworthy Agricultural College), Messrs. W. J. Adey (Director of Education), L. S. Smith (Secretary Minister of Agriculture), W. L. Summers, H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

After having been introduced to the audience, His Excellency the Governor (Sir Winston Dugan) thanked his hearers sincerely for the very kind welcome they had given him. He said that he was very interested in the man on the land, and particularly the man who was striving hard under very adverse conditions outback. This was the man he wanted to see—the pioneer who was the great descendant

of those men who came out here in the early days, and made Australia, and particularly South Australia, what she was to-day. So far he had visited only a few country districts, but in each of them he was tremendously impressed not only with the loyalty which everyone expressed towards His Majesty the King and the British Empire, but also with the warm welcome and the hearty way in which everyone shook him by the hand.

It was the man on the land who was going to make and improve this great State, and at the Congress there were representatives of men and women who were engaged in agriculture banded together to learn something to increase their knowledge. Science had come to their aid in many respects, and experts who were carrying out investigations were in a position to teach the farmer how to improve the conditions under which he lived. He did not include himself as an agriculturist, but he was very interested and anxious to learn, and they were present at the Congress to learn how to overcome their difficulties and trials, and to improve their conditions in order to go further towards prosperity. In the short time he had been in South Australia he had learnt a good deal about the conditions under which the people on the land lived, and he realised what those difficulties were, and he also knew how well those difficulties were being surmounted.

His Excellency continued that he fully realised the great work that was being carried out by the Agricultural Bureau, and the important investigations which were being made in the producers' interests; and he asked delegates to consider very seriously the question as to whether more people should not join the Bureau and take advantage of the knowledge and information which was there to improve the conditions on the land. In some cases science had converted what might have appeared to be a barren desert into a valuable soil, and there was no reason why science should not go further, and even improve the conditions which were brought about by drought. He trusted that the Congress would teach the delegates a good deal, and give some help in the trials and difficulties, as well as the problems in which they were engaged.

THE MINISTER'S ADDRESS.

The Hon. A. P. Blesing, M.L.C. (Minister of Agriculture) congratulated His Excellency, on behalf of the Agricultural Bureau, on his assumption of office, and expressed pleasure to see that, like his predecessors, he was taking an early opportunity to associate himself with our rural interests. He assured His Excellency of the appreciation and support of all the men on the land. The Minister congratulated members of the Agricultural Bureau on their 45th Congress, and hoped that it would prove as successful as the best Congresses of the past. Forty-five years of continuous work was a long span for an organisation of this kind; but since the Agricultural Bureau and its Branches extended from Warcowie in the north to Allandale in the south, and from Fowler's Bay in the west to Pinnaroo in the east, the system was entrenched in the affections of the people, and as such would go on for ever, or until such time as high tariffs succeeded in driving the last South Australian farmer off the land. He expressed his own appreciation of the Bureau as an old member of long standing.

Referring to seasonal prospects, Mr. Blesing said the autumn and winter rains were deplorably low, and by the end of July there was no feed and few crops above ground. August proved wonderfully good throughout the State, and for the time being saved the situation. Although feed continued scanty, crops began to make progress, and were supported by early September rains. With a favourable October and early November, the season might finish satisfactorily.

As Minister, he had been concerned with several important Agricultural Bills. Unfortunately, two were rejected in the Upper House, namely, The Sale of Fruit Act Amendment Act, 1934, and The Agricultural Seeds Act, 1934. That was

regrettable, because it was essential that farmers should be protected in the purchases of seed which they were compelled to make from time to time. It was not only the loss of money that was of importance, but chiefly perhaps the waste of time. The Fruit Grading Act, the Tobacco Act, the Pest Destroyers Act, Dairy Acts, and the Margarine Act were still being considered. It was anticipated that they would be passed, and prove useful to the rural community.

Changes in the Department of Agriculture.

Mr. George Quinn, who for 47 years had served the State in various capacities, was due to retire last February. It was realised, however, that for many years data of considerable importance had been accumulating at the Blackwood Orchard, which since its inception had been controlled by Mr. Quinn. All these data, however, and the costs of collecting them would have been wasted unless early steps were taken to analyse them and present the conclusions to be derived therefrom in a form available to fruitgrowers and gardeners generally. Accordingly, on Mr. Quinn's retirement the Government decided to retain his services for this purpose, and it was hoped that all those concerned would soon be in a position to benefit from work done at Blackwood for the past 26 years.

Mr. C. H. Beaumont, Horticultural Instructor, had recently retired. The Minister thanked Mr. Beaumont for the 21 years of work well and faithfully carried out.

Drawing attention to the growing dependence of rural undertakings upon exports, Mr. Blesing said the countryside could not expand and develop unless successful export outlets were found for surplus produce. Wheat and wool they had always been able to export, although none too successfully of late. The State was now exporting butter, cheese, dried fruits, apples, pears, oranges, mutton, lamb, pork, eggs, &c.—almost everything they were able to grow. He stressed the importance for all export products of uniformity of type, quality, and continuity of supplies, and deprecated the export of second-hand and third-class goods. Australia, owing to her great distance from the main markets of the world, must build herself up a name for excellence in everything she brought to market. It was true that inferior meat, poor butter and fruit, &c., could find a market abroad at a price; but the mere offer for sale of low-class goods would eventually stamp the country they came from as a country of inferior goods. Inferior prices would be the result, and a bad name which it would take years to live down. If inferior goods could not be utilised at home they had better be destroyed than sent abroad.

The Minister hoped that the findings of the Federal Royal Commission on Wheat would be such as to give relief to wheat farmers on a rationally conceived and firm basis until such time as world recovery was complete and prices normal.

He trusted that the deliberations of the Congress would be successful, and assured members that their requests would receive the earnest and sympathetic consideration of the Government.

CHAIRMAN'S REPORT.

The following report was read by the Chairman of the Advisory Board of of Agriculture (Mr. A. J. Cooke):—

"For the second occasion it has fallen to my privilege and pleasure to preside over a Congress of the Agricultural Bureau. This privilege is extended to few and consequently it is the more highly appreciated, particularly when it is remembered that delegates who attend such gatherings are representatives of producers in important districts of the agricultural areas of the State.

Right from its inception—46 years ago—the Agricultural Bureau has had a marked influence on the agricultural practices of South Australia and the organisation may be congratulated on the fact that it has never lost faith in itself,

that it has continued successfully as an educational institution and that it has developed that spirit of mutual help and co-operation which means so much in fostering the well-being of the farming community.

Remarkable progress has been made within the past 10 years, during which period over 100 branches have been added to the list, with a net increase of 1,200 members. Even during recent years there has been an increase in the number of branches which on June 30th last stood at 336. The peak year of membership was in 1931 when the members numbered some 8,500. While the years of depression persisted there may have been some excuse for a drop of 500 to 600, but it is most interesting to note that during the recent months of August and September no fewer than 350 new members have been added to our rolls. This appears to show a stimulated interest in some districts and I sincerely hope that this example will be followed by other parts of the State.

Continuing the practice of previous years, I desire to make a short reference to the work of the Board in its relation to the Branches which it controls. Numerous items have been submitted for consideration and the Board has endeavoured to deal with them in an honest effort to bring about an improvement in the agricultural practices in various sections of primary production.

Let me mention that during the year Mr. P. H. Jones—a past chairman—resigned his seat on the Board on account of other duties, and we are pleased to place on record our high appreciation of his services. The Minister has appointed Mr. A. J. A. Koch, of Lameroo, in his place. Mr. Koch is well known as a public spirited farmer, and one who has a wide practical knowledge of South Australian Agriculture. He is a life member of the Bureau, and we look forward to his help and advice, particularly in regard to the agricultural conditions applying to the mallee districts of the State. Two members of the Board—Messrs. R. H. Martin and S. Shepherd—are at present travelling aboard and Mr. Shepherd was granted a commission to inquire into agricultural and pastoral conditions in other parts of the world. Our association with these gentlemen assures us that the State will benefit by the store of information which they will bring back with them.

Besides the control of the Agricultural Bureau, the Board acts in an advisory capacity to the Honourable the Minister and realises its responsibility when approaching the Minister on matters which it considers are of importance to the welfare of farmers. It is unfortunate, however, that although we have the full sympathy of the Minister, there has not been that improvement in the State's finances which would enable him to shower upon us all of the things which he may be called upon by branches to bestow. We have, however, appreciated his efforts in securing for us the continuance of the Annual Congress this year.

Also, the grant of £100 for the purpose of providing prizes in wheat crop competitions following a similar donation by the South Australian Farmers' Co-operative Union last year, will, it is hoped, further stimulate this class of educational activity in the wheat-growing areas of the State.

Further, the provision on this year's Estimates for a veterinary scholarship, originally suggested by the Principal of the Roseworthy College and recommended by the Board, should appeal to all members of the farming community.

Fruit growers, too, will be pleased to learn that there has been a compliance with their request for the recording of the experimental work and results at Blackwood Experimental Orchard. Mr. Quinn's services have been retained for the purpose and we look forward to the compilation of data which will be most useful to horticulturists here and abroad.

The appointment of Mr. A. G. Strickland as Deputy Chief Horticultural Instructor will, I am sure, meet with the approbation of branches specially interested in fruitgrowing. His attendance at branch meetings and conferences will be most welcome and I trust that fruitgrowers will not fail to make full use of his services.

Acting on the request of branches a series of articles, with coloured illustrations, on the "Important Weeds of South Australia" is now appearing in the *Journal*, under the authorship of Mr. G. H. Clarke, of Roseworthy College.

The reclaimed swamp areas along the River Murray are receiving Departmental attention and the Board appreciates the action of the Minister in making available the services of Mr. R. Hill in an advisory capacity to the settlers there.

There appears to be a general desire for the appointment of veterinary officers for country districts and representations have been made by the Board to the Government accordingly. This matter will be dealt with at the Free Parliament session.

During the present year special representations were made to the School of Mines for the services of wool instructors and many branches have been visited. It was impossible for the staff to give all of the branches immediate attention and the result has been that several requests will be carried forward to next year. The question of the appointment of an officer to the Department, which had been held in abeyance, has been reviewed by the Board in accordance with the Congress resolution, and a subsequent resolution at the Caliph Conference. A statement of the position has been submitted to the Minister for his consideration.

During the year a Royal Commission on the important question of the Wheat Industry took evidence in South Australia. The co-operation of the Agricultural Bureau was sought and we were thus able to place before the Commission, either by direct evidence of members or by collective questionaires, the opinions expressed from time to time on expediencies, either permanent or temporary, which might give farmers the assistance which they have desired in order to place the wheat industry on a better footing. We were represented by two members—Messrs. F. Coleman and A. L. McEwin—and the Board was able accordingly to stress the necessity for revision of tariffs as requested at Congress and Conferences. The case for a home consumption price for wheat was also placed before the Commission and it is noteworthy that in its First Report, the Commission recommends that the principle of a home consumption price should be applied to the wheat industry. No recommendation appears to have been made so far by the Commission in relation to a reduction in tariffs.

During the year we have seen a reduction in the price of kerosene, a matter which came before Congress, but we have yet to hear of favourable consideration in the matter of a reduction in the duty on this article as well as on petrol.

The Board has given its support to requests that legislation be passed to give effect to many of the recommendations of the Report of the Royal Commission on Dairy Industry Prices.

Representations were made to maunfacturers for a reduction in the price of superphosphate. Attention was drawn to the reduced price in the South-East, a condition which the manufacturers claimed was entirely due to a price war with Victorian companies. The "war" appears now to have extended over a wider front than the South-East and until the price is reduced for supplies to other districts the position will no doubt remain unsatisfactory to farmers generally.

A request was sent to the Federal Government asking for a renewal of the subsidy to users of manures to crops other than wheat crops and we have recently been informed that similar concessions to those of last year would apply this year.

The Royal Agricultural Society provided in this year's Prize Schedule, a condition that non-subscribers might enter in the agricultural produce section on the payment of a small fee. The question of extra financial assistance for the staging of Bureau Exhibits will be taken up with the Society after the completion of this year's Show.

Bulk Handling of Wheat was referred to the Government, but we have been informed that no action is to be taken for the present.

It was announced by the Chief Inspector of Stock that the complete isolation of contacts is one of the routine measures for the control of pleuro-pneumonia in stock, and that if in the opinion of an Inspector, a double fence is necessary to obtain effective isolation of paddocks, instructions are issued to the owner accordingly.

The Board has given its support to the Congress resolution asking for the introduction of legislation to provide for a Cattle Compensation Fund on the lines similar to that in Victoria, and we are in agreement with the opinion expressed at Congress and Conferences that the dehorning of bulls should be compulsory. These matters have already been submitted to the Government and it will be noted that the subject of dehorning will be discussed again at this year's Congress.

The prevention of bush fires has had the attention of the Board during the year, and it will be noted that the 1933 Act provides that inquests shall be held on certain requests being made. This matter was brought up at the 1933 Congress and further consideration is being given by the Board to other proposals from branches.

In reply to a Congress resolution, the Railways Commissioner pointed out that the difficulties experienced on Eyre's Peninsula in regard to rail freights are brought about mainly by reason of the long hauls from Port Lincoln to the inland towns, and that the scale of charges is the same as that applicable to the mainland.

The question of destruction of rabbits has had the consideration of the Government, and branches were informed that provision was made on the Estimates for the purpose. Portion of the amount would be used for the purchase of poison. No action has ever been taken to destroy rabbits on Crown lands generally in view of the large areas involved.

In connection with the request of Congress asking that details of interest should be shown on forms under the Farmers' Relief Act, an explanation was given to Branches indicating how the information could be obtained from the forms supplied.

No action was taken with reference to the request for the abolition of the system of selling wheat within a stated time under the provisions of the Farmers' Relief Act, as it was considered that this was a business matter outside of the scope of the Board.

The Board did not feel that it could push the request of Congress that more representatives of farmers should be appointed on the Farm Relief Board or on the Farmers' Assistance Board, as the Government could not be expected to grant representation of any one section of interested parties to a greater extent than other sections.

In accordance with last year's Congress resolution, the Bureau household subscription of 2s. per annum commenced in August. Although Branches have been given up to December 1 for the final revision of our rolls, it is very gratifying to be able to state that during August and September the returns of 50 per cent. of the Branches have been supplied. This work necessitated further tasks on Branch Secretaries, whose general efforts on behalf of their Branches are highly appreciated by the Board.

Although it is fully recognised that the number of Women's Branches has steadily increased, the Board has not felt justified in making a recommendation for the appointment of an organiser at present.

It will be noticed that the Agenda Committee has given special prominence to the poultry industry. No farm can afford to neglect this class of production, and a special paper on the subject will be read by Mr. C. F. Anderson (Poultry Export) to a combined meeting of the Men's and Women's Branches. After the completion of this paper a visit will be made by women members to Mr. Gameau's commercial poultry plant in order to view up-to-date methods of rearing and management.

Throughout the year there has been a continuance of the cordial relationship between the officers of the Department of Agriculture and the Board, together with the Branches of the Bureau. The Board has a very high opinion of these officers, and judging by the steady flow of requests for their services, is convinced that their work is appreciated by members of Branches. A close contact between the Departmental Officers and the farmer is essential for the improvement of our agriculture, and this is rendered possible through the medium of the Agricultural Bureau.

The meetings which were convened by Branches to hear the Trades Commissioner (Mr. C. F. G. McCann) may be quoted as instances to prove that we have the organisation always ready to call together the farmers of almost any district in the State for the purpose of imparting the most recent information on subjects in which the farming community is particularly interested.

Whilst I am aware that the advice and opinions of officers are sought by Branches generally, I may be excused for stressing the importance of this feature of agricultural education which the Department of Agriculture offers to the producer. I have had the privilege of attending Bureau District Conferences, and have been impressed with the eagerness with which members have listened to addresses and replies to questions by officers. This shows that opportunities exist for the acquisition of sound agricultural knowledge ; it is then only necessary for the farmer to take advantage of these opportunities by his attendance at the meetings which are convened for his benefit.

There has been a marked improvement in the work of the Women's Branches, which now number 45. At to-night's meeting there may be representatives of Men's Branches in districts where Women's Branches have not yet been formed. To these I would suggest that if their Branches are in any way lapsing into inactivity they should take early steps to have Women's Branches established, as we find that wherever Women's Branches exist the men show greater interest in the affairs of their own Branches. The Women's Branches have also been of great assistance in arranging Conferences, and very often the success of such gatherings has been largely due to their efforts. We have again been fortunate in having the services of Miss Campbell, of the Education Department, at Conferences and at many of the Branch meetings. The fact that her attendance at meetings is in constant demand is ample evidence of the popularity of her addresses and of the high opinion which Branches have formed of her work. A special agenda has been prepared for the Congress of Women's Branches, and I trust that they will derive the full benefit of the information which will be made available to them.

Concluding, I desire to express the pleasure of the Board at seeing so many delegates here to-night, and to convey to you our sincerest appreciation of the work you are doing for the well-being of the Agricultural Bureau of South Australia."

TUESDAY, OCTOBER 9th.

Morning Session.

The following papers were read:—"Generalities Concerning Farm Poultry," Mr. C. F. Anderson (Government Poultry Expert); "The Quality of Dairy Produce and Its Effect on Marketing Conditions," Mr. H. B. Barlow, H.D.A. (Chief Dairy Instructor); and "Fat Lambs," Mr. T. R. Secker (Tumby Bay).

These papers will be printed as separate articles.

Afternoon Session.

Mr. A. H. Robin, B.V.Sc. (Stock and Brands Department), read a paper, "Some Preventable Diseases of Pigs: Minerals for Pigs," and Mr. R. C. Scott, R.D.A. (Superintendent Experimental Work) spoke on "Pasture Species for the Non-Irrigated Grasslands of South Australia."

These papers will be printed as separate articles.

Horticultural Session.

The following addresses were delivered:—"Recent Investigations on the Apple Thrips and Green Peach Aphis," Dr. J. Davidson (Waite Research Institute; "From Seed to Fruit," Mr. H. N. Wicks (Member Advisory Board of Agriculture); and "Orderly Marketing," Mr. J. B. Murdoch (Member Advisory Board of Agriculture).

Evening Session.

Professor A. J. Perkins (Director of Agriculture) read a paper, "Some Parting Reflexions on Wheat Growing in South Australia," which will be published in the Journal as a separate article.

WEDNESDAY, OCTOBER 9th.

Morning Session.

FREE PARLIAMENT.

Mr. A. J. Cooke presided, and the following resolutions were carried:—

"That this Congress supports the Advisory Board of Agriculture in its recommendation to have veterinary surgeons appointed in country districts of the State."

"That Govenment instructors should judge crops not at the direct expense of farmers."

"That effective measures be taken to discourage the growing of Gallipoli wheat or any other of low-milling quality."

"That if unable to lower the telephone charges the time limit for people living more than 25 miles from the G.P.O. be extended."

"That the 1934-35 wheat bounty be paid on an average basis for yields of 10bush. and lower, and that on yields of over 10bush. payments be made at per bushel."

"That all discounts obtained on settlers' behalf be credited to the settler instead of the Assistance Board."

"In view of the excessive charges farmers have to pay in certain directions, we consider a lump sum should be paid quarterly for sustenance and clothing to be spent at settlers' discretion."

"That the Government be asked to make all the money provided under the Advances to Settlers Act for fencing available to farmers."

"That the Government be asked to review the water situation in districts where permanent wells or springs have not been found, and which are not likely to be reticulated for some time from some reliable reservoir."

"That the Government be asked to supply settlers with galvanized iron and cement free of tariff charges for the purpose of making artificial catchments for water."

"That no points be deducted by judges at the Royal and Agricultural Shows for dehorned bulls, and that the Government be asked to introduce a law making it compulsory for all bulls to be dehorned."

"That only Alsatian dogs registered in a stud book be allowed in the country."

"That the Commissioner of Railways be urged to run trains and buses where profitable to suit the requirements of the people instead of forcing them to use other means of transport."

"That freights on all merchandise and particularly stumps be reduced on railways at least 25 per cent."

"That Eyre's Peninsula be granted free transport for all merchandise and livestock to and from Adelaide (free transport to mean free from control of the Transport Control Board)."

"That all revenue raised by the Government for motor taxation be used for construction and maintenance of roads, and that by employing the unemployed on road construction a very great saving could be made in the unemployed relief expenditure."

"That Congress support the early introduction of bulk handling of wheat."

"That bags are not up to standard size, and this Congress strongly recommends that this matter be dealt with."

"That the dockage on wheat at country sidings in the Kimba district of 1¼d. below f.a.q. is considered very unfair."

"That the Monday evening session instead of closing at 9 o'clock or thereabouts be extended for at least one hour, which shall include a paper or an address."

"That the Government bring in a Bill to provide for the registration of veterinary surgeons."

RESOLUTIONS LOST.

"That the Government be asked to subsidise the purchase of good rams with a view to improving farm flocks."

RESOLUTION LAPSED.

"That Congress be held Monday night, Tuesday morning, Tuesday night, Wednesday morning, and Wednesday night to give delegates the opportunity to attend the show in the afternoons."

Evening Session.

Dr. A. R. Callaghan, Principal of the Roseworthy Agricultural College, gave an address, illustrated with lantern slides, "The Conservation of Fodder Under South Australian Conditions," a digest of which will appear in a subsequent issue of the *Journal*.

On Thursday morning delegates visited the Waite Research Institute.

THE USE OF CHEMICALLY TREATED CORRUGATED BANDS AS A SUPPLEMENTARY CONTROL FOR CODLIN MOTH.

[By R. FOWLER, Manager Blackwood Experiment Orchard.]

During recent years, owing to the added costs of looking after the plain bandages and the fact that with the introduction of arsenate of lead as a spray for codlin moth, a better measure of control has been attained, the practice of bandaging has fallen into disuse. In some districts where, owing to climatic conditions, it is easier to control the codlin moth by efficient spraying methods than in others, it may be uneconomical to apply bandages either chemical or plain, but there are not many districts where a determined effort is not necessary to reduce the moth population if serious loss is not to result. With the least relaxation of effort, or with no appreciable relaxation at all, there is sometimes a big increase of codlin moths in some seasons, and it is only by using all the measures known to us that we can get them in control again.

In more or less neglected orchards, where, through stress of circumstances, it is not possible to give proper attention to spraying, the chemical bandage offers a means of control that requires the minimum of effort on the part of the grower. I foresee the time when the Department of Agriculture will make the use of chemical bandages compulsory, or at the discretion of the Orchard Inspector. They would be more effective than the present methods used in many small gardens.

The idea of using chemically treated bands originated in America. In 1930 Siegler and Munger, of the Bureau of Entomology, first issued a report concerning their use, and in 1931 further experiments were made by other scientists, to determine the most effective width of band and the exact concentration of toxic material to use to get the best results. Since then further investigations have resulted in a very effective, though somewhat expensive, band being placed on the market. As the demand for these bands increases costs will no doubt be reduced.

These bands were first used in the State Experiment Orchard during the 1932-33 season, 100ft. of material being secured for the purpose. This proved sufficient to bandage 50 average sized trees. Counts of codlin larvae were made throughout the season, and, finally, the bandages were removed in June and further counts made, which revealed that 764 grubs were caught in the chemical bandages and 869 in bag bandages applied to the same trees, but above the chemical bandage. The results of this experiment indicated that it was desirable that further tests should be made, and last season (1933-34) a full roll of 200ft. of chemical bandage was used. This proved sufficient to bandage 96 average sized trees.

These bands were put out on December 26th, when the first grubs were beginning to appear in the ordinary bandages. It is well known to every fruitgrower that the moths from the over-wintering larvae emerge about blossom time, *i.e.*, towards the end of October. These moths lay eggs, the young grubs when hatched enter the fruit, take about three weeks or more to develop, and then, when fully grown, leave the fruit and seek a dark, protected place in which to spin their cocoons.

TIME OF APPLICATION.

Generally it will be found that the first mature grubs will be on the move about the middle of December, and it will be quite early enough if the bands are put on about that time. It has to be remembered that the toxic effect of the bands is likely to diminish on exposure to the weather, particularly if heavy or continuous rain occurs, so that it is not advisable to put them out until there

is some indication that there are grubs leaving the fruit. At the same time it is important not to delay too long, as it is most desirable that as many as possible of the first-brood grubs should be caught. The more first-brood grubs that are caught the less will be the damage caused by the second brood. It is generally assumed that most of the grubs on leaving the fruit, if the fruit has not already fallen, spin a web and thus reach the ground, and then look for shelter beneath the loose bark of the tree trunk or larger limbs, though they will sometimes find suitable quarters in debris of various kinds, such as stakes, props, &c.

In our experiment in 1932-33 we placed an ordinary bag bandage above the chemical band, and on the average caught a few more in this bandage than in the chemical band, so that apparently a number of grubs move down as well as up the tree. It is necessary, before applying the bands, to scrape off thoroughly all rough bark on the trunk of the tree, and in view of the fact just mentioned that grubs appear to descend as well as ascend, it would also be advisable to remove as many hiding places as possible above the trunk, in order to make the band the only harbour.

The bands were applied on December 26th and left undisturbed till May 31st. As the bands are made of corrugated cardboard, which is rather easily torn, some care is necessary when adjusting the band to the tree. A special clip is provided for fixing the band, but it may sometimes be advisable to use more than one clip on each bandage to ensure that in the uneven portions of the trunk the band fits fairly closely, otherwise it might be possible for grubs to hibernate without coming in very close contact with the chemical matter contained in the bands. These grubs might escape destruction. A few empty pupae cases have been observed, indicating that a few grubs have not been killed, but this small percentage of escaped insects is not sufficient to condemn the bands as ineffective. If the bands do not fit snugly, or if the portion of the trees beneath the bands has not been well scraped, it is possible a few grubs may spin their cocoons without coming in actual contact with the chemical and may not be killed, but the percentage that will escape in this way will be small if ordinary care is used when fixing the bands.

The bands seem to become less effective towards the end of the season, the killing action evidently becoming slower, and it might be desirable to leave them on until well into June, so that any live, but very sick worms, may be killed. This may not always be possible. We had to remove them at the State Orchard at the end of May, because magpies were tearing them off, presumably having found live grubs to eat.

A careful count of the grubs trapped by the chemical bands was made on removal. To do this great care was exercised when removing the bands, as many grubs were found between the bands and the tree. A count was made of the grubs in this position. The bands were then torn apart and a count made of the number that had made or attempted to spin cocoons in the inner channels of the corrugated cardboard. In most cases the grubs did not live long enough to spin a cocoon, but when they did, they were invariably alive within it, though in most cases very sick. That they had been affected by the chemical was indicated by their appearance, as, instead of showing the natural creamy-white colour of the codlin grub, they had changed to a reddish-brown, usually with very dark lines showing right along the back. It would seem probable that most of these affected grubs would die before the following spring, or that their future development would be seriously interfered with. That this is so seems to be indicated by the fact that of 138 similarly affected grubs placed in a breeding cage at the Waite Institute by Dr. Davidson from the 1932-33 catch only 18 emerged as moths in the spring of 1933.

The 96 trees on which the chemical bands were used during the past season were in the variety plot and carried mostly heavy crops. Early, mid-season, and

late ripening types were represented. They were sprayed four times with arsenate of lead—3lbs. of powder in 100galls. of water. The percentage of codlin fruit at picking time did not seem excessive, but 6,165 grubs were caught in the chemical bands—an average of 64 per bandage. Of these approximately 2,500 favoured a position between the band and the trunk of the tree, and 3,600 elected to hibernate in the inner channels of the corrugated bands. Of the total number of grubs caught approximately 1,600 were alive, but most of them had been more or less affected by the chemical in the bands, and would probably have died later. There was, however, a certain number that had evidently entered the bands very late in the season and did not appear at all affected, proving that at this period the bandage has little toxic property left, and that it should not be allowed to remain till it rots off the tree, but should be carefully removed at the end of May, or the beginning of June, and destroyed. An easy method is by burning, as the material is fairly inflammable.

In order to gain some information relative to the habits of the codlin larvae when seeking to hibernate and to ascertain if the chemicals in the bands acted as a repellent in any way, on the assumption that the grubs would, by instinct, avoid a situation that meant death to them, ordinary bag bandages were placed a few inches above and below the chemical bands on 10 trees. Weekly counts were made of the grubs in the ordinary bandages and the chemical bands were examined at the end of the season. A total of 767 grubs were trapped on these trees, 209 in the top bandages, 392 in the chemical bands, and 166 in the lower bandages. These figures are somewhat instructive and contrary to what one might expect. Evidently the codlin grub, when seeking to hibernate, does not accept the first comfortable position offering, but has a good look round before settling down, and the fact that 392 grubs out of 767 apparently passed over the good bag bandage and proceeded to spin a cocoon in the chemical band indicates clearly that either the codlin grub has no sense of danger or that there is nothing about the chemicals used in the bands to repel them. It is also surprising to find more grubs in the top bag bandage than in the lower bag bandage.

It is hard to say what proportion of the grubs caught in the bag bandages would have gone to the chemical bands if the bag bandage had not been there, but it is safe to assume from this data, and that collected in the previous season, that fully 50 per cent. of the grubs moving about the trees will be caught in the chemical bands, and that they are, therefore, 50 per cent. efficient. In an orchard heavily infested with codlin this would represent a considerable number of grubs. The value of the automatic band is cumulative, and they should materially assist in reducing the codlin moth population in the orchard if used in successive seasons. Particularly should this be the case where dependence is placed on spraying alone and no bandages are used owing to the added cost of examining them. The chemical bands, as previously stated, offer an easy way of killing thousands of grubs in otherwise neglected orchards and back yard gardens.

The chemical bands will not do away with the necessity for spraying, as apparently 50 per cent. of the grubs do not enter the bandages, but the sprays will have less work to do and the final result should be much cleaner fruit.

It is generally recommended that the chemical bands should not be applied to young trees with smooth bark, as injury may result, but they are quite safe on bearing trees that have developed a tough, if not rough bark. We have used them for two seasons on trees 23 years old, many of which have quite smooth bark, but beyond a slight discolouration where the band has been, the injury, if any, is too slight to affect the health of the tree.

There might be some advantage also in placing rolls of chemically treated bands in the packing and fruit house during the season, as the codlin appears to have a gregarious instinct and likes to collect in numbers in one place.

It was noted in 1932-33 that bands taken from trees affected by Woolly Aphis contained thousands of dead aphides, evidently caught while migrating to the roots for the winter. This was not so noticeable during the past season, as very few trees showed any sign of Woolly Aphis, due to the good work done by the *Aphelinus mali* parasite.

At the present time the high price of the bands prohibits their very extensive use, but it appears possible that these costs can be materially reduced.

The band consists of a strip of corrugated paper thoroughly coated with a toxic mixture of beta naphthol and oil. Beta naphthol may be obtained from manufacturers and dealers in chemicals and the engine oil from any oil company.

Comparative tests in America have proved that a 2in. band affords sufficient cocooning space to take care of any normal infestation. A wider band, therefore, would only add to the costs unnecessarily.

Formula—

Beta naphthol	1lb.
Lubricating oil	1½ pints

Cost.—The cost of materials will depend on the quantity used and where purchased. In Victoria they are quoted as follows:—

Bands—200ft. roll strawboard	2s. 6d. each; 10 rolls	1s. 10d.
Beta naphthol	1s. 9d. pound	
Engine oil (4gall. tins)	3s. 3d. gallon	
Thermometer (glass)	6s. 6d.	
Leather gloves	2s. 6d.	

The estimated cost for 3in. bands being less than 1d. per tree.

In America the estimated cost for a 2in. band is 1 cent. per linear foot, or 1 dollar = 4s. 2d. per 100 ft.

METHOD OF PREPARATION.

Mix the beta naphthol and oil into a suitable container and heat until all the beta naphthol has gone into solution. Continue heating until a temperature of 265° to 270° Fahr. is reached. Maintain the temperature within this range throughout the treating process.

Care should be taken as beta naphthol boils between 280° and 286° Fahr. Both beta naphthol and oil are very inflammable, but not explosive. If the temperature of the mixture is too high the band will not have a sufficiently heavy coating. On the other hand, if the temperature is too low there is a greater tendency for the corrugated tubes to become clogged at the openings. The bands should not be prepared indoors if an open fire is used as a source of heat. The beta naphthol crystals, which resublime in the air, are more or less irritating to the eyes and skin, and to the mucous lining of the nose, and the fumes should be avoided as much as possible. Much handling of the mixture will often cause a tingling or numbness of the fingers, but this condition passes away without any serious consequences.

The rolls of corrugated strawboard should be immersed in the solution when at the right temperature for approximately one second, and the dipping process should be repeated, thus securing the right weight of chemical coating. The weight recommended is 1oz. to each linear foot of 2in. band.

A complete double dipped roll of 125ft. would, therefore, weigh about 10½lbs. Rainfall and temperature are factors in determining the proper weight of coating. Since the loss of toxic chemicals resulting from these factors cannot be predicted in advance, it is better to be on the safe side than to use a band which is inadequately coated.

The directions given for preparing the bands are those recommended by E. H. Siegler and F. Munger, of the Bureau of Entomology, U.S.A. These gentlemen have done a considerable amount of experimental work with chemical bands.

STATE OF SOUTH AUSTRALIA.

VARIETIES OF WHEAT SOWN, SEASON 1933-34.

[A. W. BOWDEN, Acting Government Statist.]

1. The Acting Government Statist reports that 186 (183) varieties of wheat were reported as sown for the wheat crop of the season 1933-34. The total acreage sown for grain, hay, and fodder was 4,074,417 (4,274,096), of which the varieties were not specified for 102,941 (139,560) acres.

2. Particulars of the 16 most popular varieties are given at foot hereof. Nabawa has occupied first place during each of the last three seasons, the proportion to the total being a little higher each season. This season Ranee has risen from fourth position to second, displacing Gluyas, which had held first place prior to 1931-32. Gallipoli again holds third position, with an increased proportion to the total. Sword is one of the newer varieties which increased from 139 acres in 1930-31 to 23,047 in 1932-33 (twenty-fourth on list), and this season rose to eighth position, and Ghurka has risen from twenth-eighth to sixteenth. The two leading varieties accounted for one-third of the total area sown, while the leading four accounted for more than one-half.

3. *The leading varieties favoured in each of the Divisions, and their percentages to the total were*:—Central—Nabawa, 24; Ford, 10; Ranee, 9; Waratah, 8; Sword, 7; Gallipoli, 6. Lower North—Nabawa, 20; Ranee, 12; Ford, 10; Gallipoli, 9; Waratah, 8; Gluyas, 5. Upper North—Ranee, 34; Nabawa, 20; Federation, 11; Gallipoli, 6; Waratah, 4. South-East—Gallipoli, 55; Ford, 9; Ranee, 6; Nabawa, 3½; Federation, 2; Major, 2. Western—Nabawa, 25; Gluyas, 19; Late Gluyas, 11; Waratah, 7; Ford, 6. Murray Mallee—Nabawa, 22; Gallipoli, 22; Ranee, 11; Gluyas, 8; Late Gluyas, 3.

4. *Varieties Increased.*—The following leading varieties show increases:—Ranee, 432,771 (305,966); Gallipoli, 398,496 (325,961); Ford, 264, 970 (193,035); Waratah, 251,450 (209,362); Sword, 105,494 (23,047); Dan, 58,157 (44,776); and of the lesser Aussie, 52,653 (42,388); Ghurka, 40,107 (19,251); Quality, 32,616 (24,149); and others.

5. *Varieties Decreased.*—Nabawa, 915,520 (945,869); Gluyas, 385,311 (493,365); Late Gluyas, 170,966 (261,352); Currawa, 100,056 (130,169); Federation, 94,872 (170,612); Sultan, 66,417 (104,452); Felix, 60,053 (95,528); Caliph, 31,869 (70,817); also Daphne, Sepoy, Canberra, and others.

6. *Sixteen Leading Varieties of Wheat Sown* 1933-34 *and* 1932-33:—

Kind of Wheat.	Total Area Sown for Grain, Hay, &c.		Percentage to Total.		Relative Position.	
	1933-34.	1932-33.	1933-34.	1932-33.	1933-34.	1932-33.
Nabawa	915,520	945,869	22·47	22·13	1	1
Ranee	432,771	305,966	10·62	7·16	2	4
Gallipoli	398,496	325,961	9·78	7·63	3	3
Gluyas	385,311	493,365	9·46	11·54	4	2
Ford	264,970	193,035	6·50	4·52	5	7
Waratah	251,450	209,362	6·17	4·90	6	6
Late Gluyas	170,966	261,352	4·20	6·11	7	5
Sword	105,494	23,047	2·59	0·54	8	24
Currawa	100,056	130,169	2·46	3·04	9	9
Federation	94,872	170,612	2·33	3·99	10	8
Sultan	66,417	104,452	1·63	2·44	11	10
Felix	60,053	95,528	1·47	2·23	12	11
Dan	58,157	44,776	1·43	1·05	13	16
Aussie	52,653	42,388	1·29	0·99	14	17
Daphne	41,018	54,078	1·01	1·27	15	14
Ghurka	40,107	19,251	0·98	0·45	16	28
Other and unspecified	636,106	854,885	15·61	20·01	—	—
	4,074,417	4,274,096	100·00	100·00	—	—

Artificial Manures used 148,923 (150,800) *tons for crops*—10,066 (7,195) *tons for top-dressing*. (*Subject to slight revision*).

Division.	Area under all Crops, Etc.						Manure Used.					
	Total.			Per Cent. Manured.			Total.			Average Per Acre.		
	1931-32.	1932-33.	1933-34.	1931-32.	1932-33.	1933-34.	1931-32.	1932-33.	1933-34.	1931-32.	1932-33.	1933-34.
	Acres.	Acres.	Acres.	%	%	%	Tons.	Tons.	Tons.	Lbs.	Lbs.	Lbs.
Central	1,074,226	1,090,834	1,063,276	86·34	89·33	88·64	42,407	44,219	43,010	102·4	101·7	102·2
Lower North	1,068,668	1,047,429	1,041,981	93·04	94·01	94·67	33,449	34,017	34,405	75·4	77·4	78·1
Upper North	463,135	435,613	389,983	47·44	53·19	61·37	5,227	5,780	5,999	53·2	55·9	56·1
South-Eastern	131,137	129,024	117,249	83·21	80·99	76·86	4,912	4,665	4,043	100·8	100·0	100[illegible]
Western	1,309,536	1,307,627	1,321,299	71·35	82·41	81·09	24,241	28,325	27,658	58·1	58·9	57[illegible]
Murray Mallee	1,173,168	1,156,129	1,142,488	87·69	89·55	92·46	31,417	33,794	33,808	68·4	73·1	71[illegible]
Total State ...	5,219,870	5,166,656	5,076,276	80·72	85·32	86·40	141,653	150,800	148,923	75·3	76·6	76[illegible]
Increase or decrease(—)	—206,204	—53,214	—90,380	—9·97	4·60	1·08	—41,253	9,147	—1,877	—8·0	1·3	—0[illegible]

Manures.—In addition to 148,923 (150,800) tons, manure used for crops as above 10,066 (7,195) tons were used for top-dressing—the acreage [illegible]p-dressed being Counties Adelaide, 34,374 (24,560); Carnarvon, 5,544 (1,581); Hindmarsh, 36,886 (28,698); Light, 4,925 (1,548); Sturt, 10,805 (9,[illegible]86) Buckingham, 10,192 (6,139); Grey, 31,029 (22,660); MacDonnell, 18,651 (16,073); Robe, 46,553 (31,188); Others, 13,042 (8,955); Total, 212,001 (150,688).

Note.—The maximum percentage of cropped area manured was 92·62 in 1929-30, and the maximum quantity per acre was 93·1lbs. in 1926-27. The maximum area top-dressed was 302,114 acres in 1929-30.

RESULT OF WHEAT CROP COMPETITIONS: SEASON 1934-35.

CENTRAL CROP COMPETITION, 1934.

Judged by W. C. JOHNSTON, R.D.A., District Agricultural Instructor.

Name and Address.	Variety.	Position.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
	Maxima—		35	25	20	15	5	100
A. H. Wolf, Rosedale	Pine Head ..	1	35	23	18·5	14	3·5	94
C. S. Nankivell, Willaston	Ford	2	30	20	16	13	4	83
J. Eden, Roseworthy	Sword	3	27	20	17	14	3·5	81·5
Matters and McCabe, Wasleys	Sword	4	22	22	19	14	4	81
W. K. Oliver, Wasleys	Sword	5	19	24·5	19	14	3·5	80
N. J. W. Griffiths, Salisbury	Sword and Bencubbin	6	23	21	18	13·5	3·5	79
Kerr and Cliff, Roseworthy	Waratah ...	6	21	23	17	14	4	79
Dawkins and Aunger, Gawler	Sword	6	22	22	18	13·5	3·5	79
C. S. Nankevill, Willaston	Sword	6	23	21	17	14	4	79
L. W. George, Wasleys	Sword	10	20	22	18·5	14	4	78·5
P. Malone, Roseworthy	Sword	11	20	22	17	14	4	77
N. J. W. Griffiths, Salisbury	Ghurka and Dundee	11	20	22	18·5	13	3·5	77
L. W. George, Wasleys	Ford	13	19	22	19	12	4	76
E. H. C. Fisher, Pinkerton Plain	Sword	14	17	23	17	14	3	74
W. F. Leak, Willaston	Pine Vale and Nabawa	14	21	19	17	14	3	74
W. F. Leak Willaston	Sword	16	16	20	17	14	4	71

BUXTON CROP COMPETITION, 1934-35.

Judged by H. D. Adams, District Agricultural Instructor.

Name and Address.	Variety.	Position.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
L. S. & R. J. Beinke, Kimba	Sword	1	30	21	19	13½	4½	88
H. Cant, Kimba	Sword	2	24	23½	19½	14½	4½	86
J. E. Beinke, Kimba	Sword	3	23	23½	19½	14	4½	84½
T. W. Hutchens, Kimba	Sword	4	23	23	19	14	4½	83½
J. J. Rogers, Pinkawillinie	Merriden .. Felix	4	23	24	19	13½	4	83½
C. G. & G. W. Cant, Kimba	Waratah .. Sword	6	23	23	18	14	4½	82½
F. Freeth, Pinkawillinie	Sword ..... Nabawa ...	7	21	23½	18½	13½	4½	81
J. B. Hudson, Pinkawillinie	Merriden ...	8	20	23	19	13½	4½	80
C. K. Wake, Pinkawillinie	Merriden ...	9	20	23	18½	13½	4	79

CODLIN MOTH CONTROL.

RESULTS OF EXPERIMENTS AT BLACKWOOD, 1933-34.

[R. FOWLER, Manager Blackwood Orchard.]

The 1933-34 season was an "on" year so far as the apple crop at this station is concerned, and as is usual under such circumstances, the control of the Codlin Moth appeared to be more efficient than is possible in the "off" years. A long, dry, and hot summer was experienced which covered practically the whole growing period of the fruit and extended well into harvesting time, with the result that there was much undersized fruit, and picking was unduly delayed. To enable the fruit to develop into the export grades, much of it had to remain on the trees weeks longer than would have been the case under normal conditions. This meant that in the experimental plots the fruit was exposed to Codlin attack for various periods as fruit on some trees developed more rapidly than on others. As an illustration, Cleopatra were harvested from the beginning of March to the end of April—a period of eight weeks—and many Codlin Moths were on the wing up to the middle of March. The weather conditions generally throughout the summer might be considered as favourable for the development of Codlin Moth.

The experiments this season were designed with the idea of again testing the value of summer oil sprays—

(1) In combination with arsenate of lead, both in standard and reduced quantities.

(2) Used alone after two early arsenate of lead sprays.

(3) Used alternately with arsenate of lead sprays.

(4) Used in combination with nicotine sulphate as a final spray.

Two important factors have to be kept in mind when preparing spray schedules. The cost of the sprays and their influence on the amount of arsenical residue. To be of economical value, the results must be satisfactory from both these points of view.

In addition to spraying tests, further studies were made with—

(1) Lures and bait traps, both as a means of reducing the moth population in the orchard, and as an indication of the emergence of moths to determine the best times at which to apply the sprays.

(2) Bandages, both chemical and the ordinary bag bandages for trapping grubs after they have left the fruit.

BAIT TRAP, OR LURE EXPERIMENTS.

Experiments in this direction have been carried out at this Experiment Station since 1925; and have been fully discussed in previous reports issued by the Agricultural Department. In the early experiments several different liquids were tried for attracting the moths to the traps, and after numerous trials it was found that molasses at a dilution of 1 in 10 gave the best results. This lure was found, after many careful records had been made, to attract more moths than either vinegar or fermented apple juice, and at the same time was not so destructive to other beneficial insects, such as Ladybirds and Lacewing Flies. Consequently, molasses solution has been used in our experiments for some seasons.

In all, 49 traps were used in different parts of the orchard, and regular weekly counts of the moths trapped and at intervals sex determinations were made. The first moths were caught in a trap near the fruit sheds on October 23rd, and in the

experimental traps the first count was made on October 30th. The results of the trapping tests will be found in Table I.

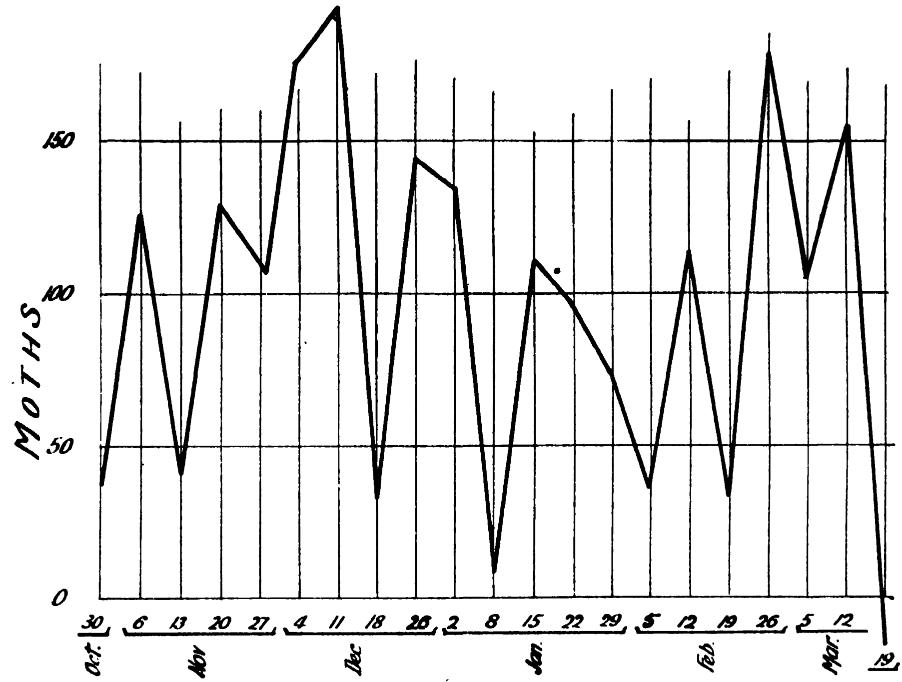
A study of the figures shows that a considerable number of moths can be caught by this means, each trap in the experiment averaging 41.4 moths for the season. From an examination of 1,146 moths it would seem that in the early part of the season there are slightly more females than males, 54.5 per cent. to 45.5 per cent., and that the proportion of females to males increases towards the end of the season, 67.3 per cent. to 32.7 per cent. No dissection of females was made, as previous determinations in this direction have proved that most of the females, when caught, are either gravid or in a fit condition for egg-laying, it seems safe to assume that if lures were used systematically throughout the orchard the moth population could be considerably reduced, and a cleaner crop result; but efforts to prove this in previous experiments by comparing results from trapped and untrapped portions of the orchard were not successful.

TABLE I.—*Weekly Counts of Codlin Moths in Bait Traps, Blackwood,* 1933-34.

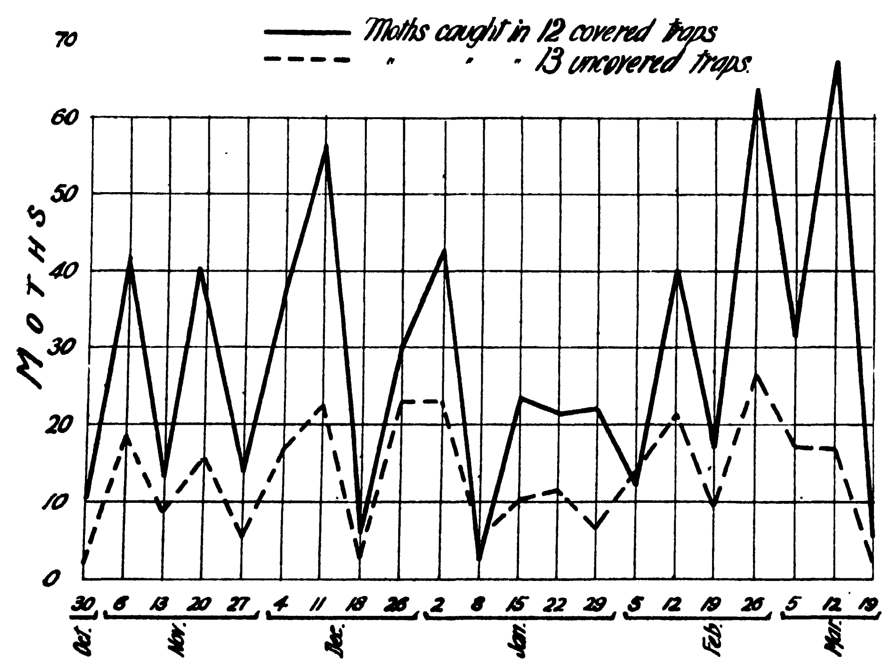
Week ending	Total Catch.	Codlin Sex Determination.			
		Males.	Females.	Total Examined.	
30.10.33	38	—	—	—	
6.11.33	128	63	42	105	
13.11.33	41	19	22	41	
20.11.33	128	51	63	114	
27.11.33	106	51	52	103	
4.12.33	173	85	74	159	Number of traps used 49.
11.12.33	191	86	99	185	Average catch per trap, 41·4.
18.12.33	33	—	—	—	First moth caught October 23rd.
26.12.33	144	—	—	—	
2.1.34	136	65	62	127	*Sex determination.*
8.1.34	9	—	—	—	Moths examined, 1,146 ; males, 522,
15.1.34	110	—	—	—	females, 624.
22.1.34	97	—	—	—	Per cent. males to females ; 45·55
29.1.34	72	—	—	—	per cent., 54·45 per cent.
5.2.34	37	—	—	—	Second brood ; males, 32·7 ; females
12.2.34	112	—	—	—	67·3.
19.2.34	34	10	23	33	
26.2.34	176	55	116	171	
5.5.34	105	33	66	99	
12.3.34	152	—	—	—	
19.3.34	9	4	5	9	
Total ..	2,031	522	624	1,146	

Quite apart from their value in reducing the moth population, the lures do indicate when the Codlin Moths emerge in the greatest numbers and are most active. Consequently sprayings can be timed so that they should give the best results. This was pointed out in the first report on Codlin Moth experiments from this station, issued in 1926, and graphically illustrated on page 6 of Bulletin 201, issued by our Department of Agriculture. It was noticed when plotting this graph that when sprays were applied on a time schedule, as had always been the practice, that they did not always coincide with the periods of maximum emergence of moths, and in this particular season our third and fourth sprays were applied 6 or 7 days too late to expect maximum results.

A further study of the figures in Table I. reveals that during the past season at Blackwood the emergence period of Codlin Moths of the various broods was very much intermixed. On Graph No. 1 the weekly figures for the numbers of moths



Graph No. 1.



Graph No. 2.

caught are plotted. An examination of the graph reveals the probable occurrence of two broods, the maximum emergence of the first brood being about December 11th, whilst the maximum emergence of the second brood was approximately February 26th. There appears no evidence of a third brood, and young grubs were not at all numerous late in the season.

It will be noted also that many times, at irregular intervals, comparatively large numbers of moths emerged, and that Graph No. 1 does not reveal well-defined maximum emergence periods, as does the graph published in Bulletin No. 201. The abnormal seasonal conditions may have been the cause of this irregular emergence on the part of the Codlin Moths.

An interesting point that received attention this past season was the question whether birds interfered with the bait trap records by removing the trapped Codlin Moths. At various times small birds have been found drowned in the liquid, and it was thought they may have been after the moths. Twenty-five flower pot traps were used in one portion of the orchard, and each alternate trap was fitted with a wire-netting cover, and separate records made. The covered traps averaged for the season 51.5 moths per trap, and the uncovered 20.6 moths. These results are supported by previous experiments, so that there seems reason to think that there is a danger, where wire-mouthed traps are used, that the birds might upset the accuracy of the lure records for the proper timing of sprays. Graph 2 shows a comparison between covered and uncovered bait traps.

Experiments with Bandages.

All the trees in the various spraying tests were bandaged with the ordinary bag bandages made from wheat sacks. These were examined at approximately weekly intervals, and in Table II. the results are shown. It will be seen that 2,303 grubs were caught in 189 bandages, an average of 12.18 per bandage. The first grubs appear to reach the bandages towards the end of December, and large numbers accumulate there at the end of the picking season.

Table II.—*Weekly counts of Codlin Moth Grubs caught in Bandages, Blackwood*, 1933-34.

Date Examined.	No. of Grubs.	Date Examined.	No. of Grubs.
22/12/33	19	16/2/34	88
29/12/33	40	20/2/34	127
5/1/34	51	2/3/34	77
12/1/34	45	8/3/34	270
19/1/34	106	20/5/34	1,171
26/1/34	106	Total catch from 189 bandages	2,303
2/2/34	105	Average per bandage	12·18
9/2/34	98		

The number of grubs caught seems to indicate that though trees may be thoroughly sprayed, as these trees were in the tests, the use of a bandage is still necessary to maintain effective control.

Chemically treated bands were also used. These results have been the subject of a separate report.

Spraying Experiments.—Discussion of Results.

As previously set out, the spray schedules were arranged with the primary object of finding out whether the inclusion of white summer spraying oils in various ways in the spray schedules would give a more effective control of Codlin Moth than the arsenate of lead sprays at present mostly favoured by growers, and whether the standard dosages of arsenate of lead and white oil could, without impairing their effective control of Codlin Moth, be so reduced that their use would be

economically sound, and at the same time reduce the amount of arsenical residue to the limit of tolerance provided by health regulations both here and abroad.

Details of spray schedules are as follows:—

DETAILS OF SPRAY SCHEDULES, BLACKWOOD, 1933-34.

Spray No.	Spray Material.	Date of Application.
	Plot A.—Cleopatra variety—	
1	*Lead arsenate 4lbs. to 100gals., plus cal. caseinate, ½lb. to 100gals....	24/10/33
2	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb. to 100gals....	9/11/33
3	Lead arsenate, 4lbs. to 100gals., plus lethalate powder, 4oz. to 100gals.	8/12/33
4	Lead arsenate, 4lbs. to 100gals., plus lethalate powder, 4oz. to 100gals.	10/1/34
5	White oil, No. 1, ¾gal., per 100gals. and nicotine sulphate, 1-1600	20/2/34
	Plot B.—Cleopatra variety—	
1	Lead arsenate, 4lbs. to 100 gals. cal. caseinate, ½lb. to 100 gals.	24/10/33
2	Lead arsenate, 4lbs. to 100gals. cal. caseinate, ½lb. to 100gals.	9/11/33
3	Lead arsenate, 2lbs. to 100 gals., plus ¾gal. white oil to 100gals.	8/12/33
4	Lead arsenate, 2lbs. to 100gals., plus ¾gal. white oil to 100 gals.	10/1/34
5	White Oil, No. 1, ¾gal. to 100 gals. and nicotine sulphate, 1-1600	20/2/34
	Plot B1.—Jonathan variety—	
1	Lead arsenate, 4lbs. to 100gals., cal. caseinate, ½lb. to 100 gals.	24/10/33
2	Lead arsenate, 4lbs., to 100gals., cal. caseinate, ½lb. to 100gals.	9/11/33
3	White oil, No. 1, 1-60..	8/12/33
4	White oil, No. 1, 1-60..	10/1/34
5	White oil, No. 1, 1-60..	20/2/34
	Plot C.—Cleopatra variety—	
1	Lead arsenate, 4lbs., to 100gals., cal. caseinate, ½lb. to 100gals.	24/10/33
2	Lead arsenate, 4lbs. to 100gals., cal. caseinate, ½lb. to 100gals.	9/11/33
3	White oil, No. 1, 1-60..	8/12/33
4	Lead arsenate, 4lbs. to 100, plus lethalate spreader, 4oz. to 100	10/1/34
5	White oil, No. 1, 1-60..	20/2/34
	Plot D.—Cleopatra variety—	
1	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb. to 100gals. ..	24/10/33
2	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb to 100gals., ..	9/11/33
3	Lead arsenate, 3lb. to 100gals., plus 1gal. white oil to 100gals.	8/12/33
4	Lead arsenate, 3lb. to 100gals., plus 1gal. white oil to 100gals.	10/1/34
5	White oil, No. 1., ¾gal. to 100gals., nicotine sulp., 1-1600	20/2/34
	Plot E.—Mixed varieties—	
1	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb. to 100.......	24/10/33
2	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb to 100	9/11/33
3	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb. to 100.......	8/12/33
4	Lead arsenate, 4lbs. to 100gals., plus cal. caseinate, ½lb. to 100.......	10/1/34
5	Omitted	—
	Plot F.—Mixed varieties—	
	Repetition of Plot B. with white oil, No. 2	10/1/34
	Plot G.—Mixed varieties—	
	Repetition of Plot C. with white oil, No. 2, and nicotine sulphate as last spray	10/1/34
	Plot H.—Mixed varieties—	
	Repetition of Plot D. with white oil, No. 2	10/1/34
	Plot I.—Cleopatra variety—	
	Repetition of Plots B and F. with white oil, No. 3.	10/1/34
	Plot J.—Cleopatra variety—	
	Repetition of Plots B. F. and I. with white oil, No. 4	10/1/34
	* Lead arsenate in all schedules in powder form.	

The trees in the plots consisted mostly of Cleopatra Apple Trees, though some plots contained mixed varieties, *i.e.*, Cleopatra, Dunn's Seedling, Jonathan, and Scarlet Nonpareil. Most of the plots contained 12 trees, the smallest comprising 8 trees.

Computations of the results were made by actual weighing of all fruits, including windfalls, harvested from the total number of trees in each test. No distinction was made between actual entrances and stings, provided the blemish caused

by the sting rendered the fruit unfit for export. Computing results by weight gives a fairly accurate measure of the wastage due to attacks by Codlin, and can be considered a fair way in which to set a value on any particular spray schedule.

In the above spray programmes all spraying was thoroughly done, an ordinary motor spray pump being used. The spray was applied at a pressure of 170lbs. to 200lbs. with spray pistol grips and rod nozzle attachments. This type of delivery allows the operator to direct the spray from above as well as below, and ensures a better distribution of the spray fluid.

In Table III. the complete results are set out.

TABLE III.—*Results of Spraying Tests, Blackwood,* 1933-34.

Plot.	Spray Schedule.	Clean Fruit.	Codlin Fruit.	Percentage of Codlin Apples by Weight.
		Lbs.	Lbs.	
A	Lead arsenate with spreader four times, and one white oil and nicotine sulphate spray	4,026	120½	2·90
B	Lead arsenate twice, decreased quantity of arsenate, but with small amount of white oil in combination, and one white oil and nicotine sulphate spray	4,214	95½	2·22
B1	Lead arsenate twice, followed by three white oil sprays	2,095¾	32½	1·53
C	Lead arsenate twice, then alternate sprays white oil and lead arsenate, with oil spray last	3,537	66¾	1·85
D	Lead arsenate twice. increased quantity lead arsenate and white oil in combination twice, white oil and nicotine once	3,282½ 3,282½	45¾ 34¾	1·37 1·37
E	Arsenate of lead with spreader four times, fifth spray omitted	2,999½	251½	7·74
F	Repetition of Plot B with white oil No. 2..	3,505¾	157¾	4·31
G	Repetition of Plot C with white oil No. 2, and white oil and nicotine sulphate as last spray	4,025¼	171¼	4·09
H	Repetition of Plot D, with white oil No. 2	2,855¾	107½	3·66
I	Repetition Plots B and F, with white oil No. 3	2,772¾	96¼	3·35
J	Repetition Plots B, F, and I, with white oil No. 4	3,760	109½	2·83

A study of the results shows that there were really no significant differences in the degree of control obtained in Plots A, B, C, and D, which are comparable, as each contained the same number of Cleopatra apple trees. Actually the least percentage of infestation was shown by spray programme D followed by Schedule C, but the efficiency of either programme will depend on whether the extra clean fruit obtained will more than counterbalance the extra costs of added materials in each spray programme, and whether the arsenical residue was below export tolerance.

The question of comparative costs will be dealt with later, but it can be seen at a glance that the significant difference is so small that the extra value of clean fruit could not cover extra costs of spraying material, so that the amount of arsenical residue will be the determining factor in the value of these respective schedules.

Plot B consisted of 12 Jonathans, and in this schedule of 2 arsenate sprays followed by 3 oil sprays good Codlin control was obtained without any serious detriment to the colour of the fruit. The fruit was never highly coloured, but the same condition prevailed where white oils were not used, the hot, dry summer probably being responsible.

Plots E, F, G, H, I were mostly repetitions of previous spray programmes with various brands of white oils.

Plots E, F, G, H each contained 4 varieties (2 of each), and here again results are comparable. The significant differences are again small, with the possible exception of Plot E, where the last spray was omitted.

It would seem that this omission resulted in a heavier infestation in this particular plot.

Plots I and J consisted of 14 and 12 trees each of Cleopatra apples in a portion of the orchard removed from the other plots, and in which no bait traps were used.

The percentages of infestation in each case appear to show no significant differences. It can be claimed for the whole of the schedules that each gave very effective control as regards Codlin Moth, with the probable exception of Plot E, where the fifth spray was omitted

ARSENICAL RESIDUES.

The amount of arsenical residue remaining on the fruit at picking time after using any particular spray schedule is an important factor in deciding whether that schedule is a suitable one to adopt in general practice as a limit has been placed on the amount of arsenic that may be present on fruit at time of shipment. The amount of arsenic allowable is 0.01 grains per lb. of fruit estimated as arsenic trioxide (As_4O_6).

In order that the samples forwarded to the Director of Chemistry for analyses should be as nearly as possible comparable with the fruit submitted for shipment, they were subjected to the same treatment as export fruit, that is to say, they were handled in the same way from the tree to the packing shed, put through the grader, and again handled as if being packed.

The Department of Chemistry, to whom we are indebted for the analyses of the samples, reports as follows:—

Spray Schedule.	Arsenic as As_4O_6 in grains per lb. of fruit.
A	0·013
B	0·032
B¹	0·026
C	0·018
D	0·037
E	0·017

From the above figures it would seem that none of the spray schedules left an arsenical residue that would come within the export tolerance though A, C, and E are not greatly in excess of the allowable limit. The arsenical residue in B¹ is rather surprising as this schedule contained only 2 arsenate sprays followed by 3 oil sprays, and in a previous test showed only 0.005. Some slight alteration in A, C, E schedules could possibly be made whereby the arsenical residue could be slightly reduced without impairing their Codlin control efficiency.

Spraying Costs.

Costs play an important part in the selection of a spray schedule. The extra costs of spray materials in any schedule must be more than counterbalanced by the increased percentage of clean fruit at picking time before a new programme can be considered as economically sound. In Table IV. an attempt is made to show the comparative costs of Schedules A to E; 100galls. of spray mixture is used as a unit of comparison. Unfortunately a schedule was not included in which arsenate of lead only, with spreader, was used 5 times. In Schedule E, to make a comparison with Schedule A, the last spray was omitted, so that only 4 sprays were applied, and it cannot be used to compare costs. In the table, Schedule A has been used for purposes of comparison, though the last spray of oil and nicotine sulphate increased the cost of this schedule considerably. Taking into consideration the efficiency of the schedules and comparing costs, it will be seen that all of them were economically sound, though in B and D it would probably have been necessary to treat the fruit for arsenical residue before shipping. This added expense would more than counterbalance any increased profit from these schedules..

Table IV.—*Spraying Costs.*

Spray Schedule.	Arsenic Sprays. No.	Arsenic Sprays. Cost.	Arsenic Sprays. Total.	Oil Sprays. No.	Oil Sprays. Cost.	Oil Sprays. Total.	Nicotine. No.	Nicotine. Cost.	Spreader.	Total Cost.	Extra Cost over A
		s. d.	s. d.		s. d.	£ s. d.		s. d.	s. d.	£ s. d.	s. d.
A	4	3 2	12 8	1	4 1	0 4 1	1	3 5	3 0	1 3 2	—
B	2	3 2	6 4	3	4 1	0 12 3	1	3 5	1 6	1 6 8	3 6
	†2	1 7	3 2								
B¹	2	3 2	6 4	3	9 2	1 7 6	—	—	1 6	1 15 4	12 2
C	3	3 2	9 6	2	9 2	0 18 4	—	—	1 6	1 9 4	6 2
D......	2	3 2	6 4	2	5 6	0 11 0	1	3 5	1 6	1 11 0	7 10
	*2	2 4	4 8	1	4 1	0 4 1					
E	4	3 2	12 8	—	—	—	—	—	3 0	0 15 8	—

† 2lbs. per 100galls.
* 3lbs. per 100galls.

As the differences in percentages of clean fruit in the various schedules are so small, no attempt has been made to work out a profit or loss Table. Table IV. is included to show that from a costs point of view all the schedules were economically sound.

Summary.

All spray programmes gave satisfactory control of Codlin Moth last season.

No outstanding results could be claimed for any particular schedule as regards efficiency of control, all proving satisfactory.

Reduced quantities of arsenate of lead and white oil can be used without loss of efficiency.

None of the spray schedules reduced the arsenical residue below the export tolerance.

The inclusion of white oils in combination with arsenate, or following two arsenate calyx sprays, or used alternately with arsenate of lead, do not appear to give significantly better control in this season's experiments.

All spray programmes were economically sound, though in some the arsenical residue was somewhat high.

In conclusion, I would like to express my appreciation of the assistance received from the Assistant Orchardist (Mr. C. Pollitt) in the preparation of graphs, checking of results, &c., in connection with this report.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.		
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	139		
	2	123		
	3	29	291	
	4	—		
	5	120		
	6	101	221	
				512
A. H. Matthews, Bridgewater	7	110		
	8	123		
	9	126	359	
	10	131		
	11	dead		
	12	45	176	
				535
G. W. T. Symes, Echunga	13	112		
	14	27		
	15	127	266	
	16	71		
	17	109		
	18	115	295	
				561
E. B. Gliddon, Yundi	19	126		
	20	83		
	21	dead	209	
	22	dead		
	23	80		
	24	47	127	
				336
T. Cleaver, Bridgewater	25	122		
	26	77		
	27	81	280	
	28	87		
	29	101		
	30	110	298	
				578
J. E. Assender, Echunga	31	103		
	32	104		
	33	79	286	
	34	78		
	35	84		
	36	66	228	
				514
S. Hill, Bridgewater	37	118		
	38	78		
	39	169	365	
	40	125		
	41	dead		
	42	88	213	
				578
W. Restall, Echunga	43	148		
	44	142		
	45	dead	290	
	46	102		
	47	101		
	48	125	328	
				618
C. Guthridge, Yundi	49	112		
	50	137		
	51	111	360	
	52	15		
	53	49		
	54	93	157	
				517
S. Lambert, Echunga	55	113		
	56	28		
	57	dead	141	
	58	36		
	59	92		
	60	81	209	
				350
A. Young, Bridgewater	61	88		
	62	133		
	63	91	312	
	64	115		
	65	99		
	66	124	338	
				650
D. J. Foxwell, Echunga	67	120		
	68	102		
	69	107	329	
	70	86		
	71	117		
	72	41	244	
				573
J. C. Normandale, Yundi	73	87		
	74	118		
	75	113	318	
	76	103		
	77	106		
	78	118	327	
				645
L. W. Sando, Echunga	79	140		
	80	52		
	81	102	294	
	82	129		
	83	140		
	84	90	359	
				653
J. O. Marshall, Yundi	85	128		
	86	154		
	87	52	334	
	88	dead		
	89	111		
	90	90	201	
				535
Murray Powell, Jupiter Creek	91	78		
	92	104		
	93	118	300	
	94	dead		
	95	125		
	96	68	193	
				493

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive to Nov. 10th, 1934	Totals
	97	114	
	98	129	
	99	111	354
S. Bridge, Yundi	100	68	
	101	dead	
	102	120	188
			542
	103	72	
	104	83	
	105	115	270
C. T. Rodger, Echunga	106	115	
	107	125	
	108	dead	240
			510
	109	29	
	110	13	
	111	136	178
R. H. Smith, Yundi	112	22	
	113	103	
	114	25	150
			328
	115	33	
	116	81	
	117	115	229
Willow Bend Stud Poultry Farm, North Walkerville	118	—	
	119	49	
	120	82	131
			360
	121	28	
	122	91	
	123	123	242
C. MacDonald, Echunga	124	129	
	125	111	
	126	101	341
			583
	127	143	
	128	88	
	129	130	361
T. R. Smart Yundi	130	87	
	131	dead	
	132	142	229
			590
	133	64	
	134	96	
	135	110	270
Raymoor Poultry Farm, William Street, Kilkenny	136	123	
	137	94	
	138	38	255
			525
	139	76	
	140	120	
	141	158	354
B. R. Whittington, Yund	142	68	
	143	70	
	144	116	254
			608
	145	2	
	146	143	
	147	85	230
W. A. Hazeal, 11, Rosetta Street, Rosewater	148	36	
	149	95	
	150	dead	131
			361
	151	41	
	152	78	
	153	67	186
H. F. Muirson, Yundi	154	57	
	155	126	
	156	89	272
			458
	157	3	
	158	112	
	159	93	208
K. Pennack, Pooraka	160	130	
	161	74	
	162	112	316
			524
	163	104	
	164	102	
	165	132	338
C. A. L. Sandstrom, Yundi	166	128	
	167	112	
	168	46	286
			624
	169	37	
	170	49	
	171	72	158
G. A. Bielby, Pooraka	172	111	
	173	dead	
	174	94	205
			363
	175	96	
	176	78	
	177	120	294
W. M. Field, Yundi	178	45	
	179	93	
	180	114	252
			546
	181	138	
	182	138	
	183	111	387
T. Duhring, Mallala	184	123	
	185	84	
	186	94	301
			688
	187	126	
	188	dead	
	189	45	171
W. R. Hedger, Yundi	190	82	
	191	145	
	192	dead	227
			398
	193	110	
	194	122	
	195	107	339
A. & H. Gurr, Bradbury	196	131	
	197	147	
	198	126	404
			743
	199	117	
	200	90	
	201	91	298
J. V. McGinnis, Yundi	202	69	
	203	83	
	204	18	170
			468

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
A. G. Dawes, 280, Portrush Road, Glenunga Gardens	205	134	
	206	107	
	207	137	378
	208	82	
	209	76	
	210	134	292
			670
W. U. Jones, Yundi	211	7	
	212	82	
	213	133	222
	214	99	
	215	107	
	216	37	243
			465
Langmaid & Bettison, Parafield, Salisbury	217	dead	
	218	90	
	219	37	127
	220	93	
	221	122	
	222	103	318
			445
A. Jarvis, Yundi	223	68	
	224	79	
	225	51	198
	226	119	
	227	92	
	228	129	340
			538
S. Eyles, Clarendon	229	55	
	230	dead	
	231	119	174
	232	124	
	233	126	
	234	96	346
			520
Woodbury Poultry Farm, Stirling East	235	89	
	236	17	
	237	106	212
	238	dead	
	239	50	
	240	68	118
			330
V. F. Gameau, Findon Road, Woodville	241	57	
	242	6	
	243	83	146
	244	dead	
	245	86	
	246	90	176
			322
Geo. Lomax, Yundi	247	101	
	248	24	
	249	95	220
	250	55	
	251	dead	
	252	69	124
			344
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	103	
	254	146	
	255	53	302
	256	20	
	257	11	
	258	28	59
			361

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
W. R. Williams, 28, Avenue Road, Frewville	259	152	
	260	74	
	261	5	231
	262	122	
	263	135	
	264	137	394
			625
R. W. McAllister, Yundi	265	71	
	266	53	
	267	115	239
	268	63	
	269	132	
	270	85	280
			519
G. W. Sykes, Yundi	271	65	
	272	70	
	273	101	236
	274	128	
	275	110	
	276	82	320
			556
A. P. Urlwin, Balaklava	277	129	
	278	108	
	279	122	
		359	
A. V. Dupen, Melton Street, Glenelg	280	111	
	281	153	
	282	77	
		341	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	88	
	284	148	
	285	97	
		333	
Thomas & Elson, Clifton Street, Hawthorn	286	92	
	287	57	
	288	100	
		249	
J. H. Dowling, Glossop, River Murray	289	84	
	290	123	
	291	116	
		323	
E. Pape, Wynarka	292	—	
	293	27	
	294	72	
		99	
L. S. Ekers, Mount Jagged Farm Mount Compass	295	106	
	296	97	
	297	104	
		307	
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	115	
	299	128	
	301	136	
		379	
L. R. Badcock, 77, Findon Road, Woodville	301	71	
	302	66	
	303	103	
		240	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	104	
	305	114	
	306	140	
		358	
Gallagher & Aslin, Pooraka	307	147	
	308	113	
	309	97	
		357	
R. C. Crittenden, William Street, Kilkenny North	310	119	
	311	97	
	312	81	
		297	
C. H. Lines, Junr., Gladstone	313	108	
	314	107	
	315	114	
		329	
A. J. Monkhouse Woodside	316	125	
	317	49	
	318	51	
		225	
B. Cooke, Kanmantoo	319	153	
	320	150	
	321	135	
		438	
Gallagher & Aslin, Pooraka	464	103	
	465	130	
	466	117	
		350	

The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
W. C. Slape, Magill	467	83	
	468	103	
	469	111	
		297	
Willow Bend Stud Poultry Farm, North Walkerville	474	146	
	475	7	
	476	120	273
	477	95	
	478	151	
	479	150	396
			669
Total Class 1. ...		29,512	

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	61
	323	5
	324	41
		107
G. Frisby Smith, Fulham (Minorcas)	325	—
	326	95
	327	107
		202
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	58
	329	116
	330	95
		269
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	72
	332	133
	333	104
		309
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	26
	472	102
	473	121
		249
Total Class No. 2.		1,136

Class No. 3.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934	
H. J. Mills, 108, Edward Street Edwardstown	334	132	
	335	92	
	336	127	351
	337	121	
	338	145	
	339	174	440
			791
A. G. Dawes Portrush Road, Glenunga Gardens	340	155	
	341	71	
	342	125	351
	343	98	
	344	98	
	345	116	312
			663
Willow Bend Stud Poutry Farm, North Walkerville	346	144	
	347	126	
	348	99	369
	349	100	
	350	38	
	351	50	188
			557
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	100	
	353	94	
	354	118	312
	355	67	
	356	138	
	357	99	304
			616
A. C. Byrne, 114, Rose Terrace, Wayville West	358	118	
	359	113	
	360	79	310
	361	94	
	362	51	
	363	84	229
			539
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	103	
	366	113	
		254	
C. H. Lines, jun. Gladstone	367	119	
	368	66	
	369	7	
		192	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
J. H. Dowling, Glossop, River Murray	370	42	
	371	88	
	372	57	
		187	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	112	
	374	122	
	375	117	
		351	
Mrs. M. Specht, Holder Avenue, Richmond	376	138	
	377	113	
	378	115	
		366	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	83	
	380	119	
	381	48	
		250	
G. Frisby Smith, Fulham House, Fulham	382	121	
	383	33	
	384	77	
		231	
B. Cooke, Kanmantoo	385	144	
	386	124	
	387	130	
		398	
Willow Bend Stud Poultry Farm, North Walkerville	480	149	
	481	124	
	482	134	407
	483	72	
	484	128	
	485	119	319
			726
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	163	
	459	127	
	460	165	
		455	

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Total Class No. 3.	6,927

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
A. G. Dawes. Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	95	
	389	126	
	390	70	291
	391	121	
	392	119	
	393	122	362
			653
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	99	
	395	140	
	396	147	386
	397	129	
	398	53	
	399	118	300
			686
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400	59	
	401	94	
	402	138	
		291	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	73	
	404	102	
	405	122	
		297	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	61	
	407	140	
	408	126	
		327	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	100	
	410	78	
	411	78	
		256	
K. Pennack, Pooraka (Barnevelders.)	412	128	
	413	96	
	414	133	
		357	
G. W. Lindsay, Torrens Road Kilkenny (Langshans.)	461	38	
	462	54	
	463	113	
		205	
Total Class No. 4.		3,072	

Class No. 5—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
A. O. Dawkins, Gawler	415	108	
	416	103	
	417	63	274
	418	116	
	419	140	
	420	128	384
			658
A. V. Dupen, Melton Street, Glenelg	421	56	
	422	dead	
	423	138	
		194	
A. J. Monkhouse, Woodside	424	140	
	425	120	
	426	125	
		385	
Total Class No. 5.		1,237	

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.	
A. C. Byrne, 114, Rose Terrace, Wayville West	427	70	
	428	77	
	429	86	233
	430	92	
	431	112	
	432	116	320
			553
G. Frisby Smith, Fulham House, Fulham	433	129	
	434	93	
	435	120	
		342	
Total Class No. 7.			895

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Nov. 10th, 1934.
Home Project Utility Section.—Wet Mash.		
John Plummer, Virginia School	436	107
Dudley Harper, Murray Bridge School	437	87
Jack Beauchamp, Murray Bridge School	438	75
Jack Beauchamp, Murray Bridge School	439	86
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	145
Stanley Pratt, Abattoirs School	442	126
Mervyn Steer, Sturt School	443	117
Donald Welford, Westbourne Park School	444	107
E. Zbierski, Gawler School	445	111
J. McInerney, Gawler School	446	72
F. Martin, Gawler School	447	134
Darcy Coleman, Mallala School	4	105
Kevin Angus, Mallala School	449	63
Alwin Scott, Wellington Road School	450	109
Jack Dietman, Wellington Road School	451	120
Milton Smith, Salisbury School	452	146
Owen Robinson, Ascot Park School	453	86
Paul Mundy, Urrbrae High School	454	96
Max Couche, Thebarton School	455	138
Robert Swift, Murray Bridge School	456	149
Bruce Dooland, Thebarton Central School	457	23
Ian Slee, Two Wells School	470	91
Total		2,293

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444 456, and 457 (Black Orpingtons).

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED NOVEMBER 10th, 1934.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	169	39
B. R. Whittington	158	141
J. O. Marshall	154	86
Trios—		
B. Cooke	438	319–321
A. & H. Gurr	404	196–198
Willow Bend Stud Poultry Farm	396	477–479
Teams—		
A. & H. Gurr	743	193–198
Gallagher & Aslin	707	307–309 and 464–466
T. Duhring	688	181–186

Class 2.—Any other Light Breed.

Singles—

A. Heaysman (Cuckoo Leghorn)	133	332
Langmaid & Bettison (Minorca)	121	473
V. F. Gameau (Minorca)	116	329

Trios—

A. Heaysman (Cuckoo Leghorns)	309	331–333
V. F. Gameau (Minorcas)	269	328–330
Langmaid & Bettison (Minorcas)	249	471–473

Class 3.—Black Orpingtons.

Singles—

H. J. Mills	174	339
F. F. Welford	165	460
F. F. Welford	163	458

Trios—

F. F. Welford	455	458–460
H. J. Mills	440	337–339
Willow Bend Stud Poultry Farm	407	480–482

Teams—

F. F. Welford	806	373–375 and 458–460
H. J. Mills	791	334–339
Willow Bend Stud Poultry Farm	726	480–485

Class 4.—Any other Heavy Breeds.

All Rhode Island Reds.

Singles—

A. G. Dawes	147	396
Woodbury Poultry Farm	140	407
A. G. Dawes	140	395

Trios—

A. G. Dawes	386	394–396
A. G. Dawes	362	391–393
K. Pennack (Barnevelders)	357	412–414

Teams—

A. G. Dawes	686	394–399
A. G. Dawes	653	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—

A. J. Monkhouse	140	424
A. O. Dawkins	140	419
A. V. Dupen	138	423

Trios—

A. J. Monkhouse	385	424–426
A. O. Dawkins	384	418–420

Teams—

A. O. Dawkins	658	415–420

Class 7.—Black Orpingtons.

Singles—

G. Frisby Smith	129	433
G. Frisby Smith	120	435
A. C. Byrne	116	432

Trios—

G. Frisby Smith	342	433–435

Teams—

A. C. Byrne	553	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Robert Swift, Murray Bridge (Black Orpington)	149	456
Milton Smith, Salisbury (White Leghorn)..	146	452
Eric Pratt, Abattoirs (White Leghorn) ..	145	441
Max Couche, Thebarton (Rhode Island Red)	138	455
F. Martin, Gawler (White Leghorn)	134	447

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to October 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to Sept. 30th, 1934.	No. Eggs Laid Month of Oct., 1934.	Total Eggs Laid April 1st, 1933, to Oct. 1st, 1934.
No. 1 test	10,555	848	11,403
No. 2 test	9,709	834	10,543
No. 3 test	9,465	860	10,325
No. 4 test	10,753	803	11,556
No. 5 test	5,374	574	5,948

LIST OF PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE.

BULLETINS.

Bulletins may be obtained by sending 1d. each to cover postage.

"First Aid to the Horse" by F. E. Place, B.V.Sc., M.R.C.V.S. **Price 3s., Posted, 3s. 2d.**

"Journal of the Department of Agriculture"—Subscription 5s. per annum to addresses in South Australia elsewhere 10s. per annum. Members of the Agricultural Bureau of S.A., 2s. per annum. **Single Copies, 1s. each.**

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow July to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow July to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	6·63	3·53	1,618	244·04	808·66	88·51	13·35	42·68	5·47
7/L ..	23	15·83	13,488½	586·46	1,363·23	580·50	25·24	59·96	4·30
7/P ..	26	24·67	18,926½	727·94	1,931·13	871·25	33·51	93·39	4·60
7/Aa .	25·10	20·07	14,877	592·71	1,466·99	642·29	25·59	65·16	4·32
7/Tt .	14	11·27	10,507	750·50	2,049·52	460·63	32·90	92·92	4·38
7/Uu	27	23·83	15,593½	577·54	1,645·82	687·62	25·47	71·41	4·41
7/Xx	22	16·73	14,645½	665·70	1,742·26	740·19	33·65	89·25	5·05
7/Bbb	51·30	42·67	29,841	581·69	1,630·60	1,312·90	25·59	72·58	4·40
7/Ccc	21·23	16·80	12,739½	600·07	1,319·23	549·16	25·87	57·48	4·31
7/Ddd	13	12·47	8,920	686·15	1,738·03	413·11	31·78	83·36	4·63
7/Eee	10	9	6,480	648·00	1,853·35	315·80	31·58	92·35	4·87
7/Ggg	17	11·30	6,498	382·23	894·19	279·92	16·47	40·67	4·31
7/Hhh	10·70	10·70	8,382	783·36	2,049·32	295·60	27·63	74·27	3·53
7/Iii .	15·10	10·80	12,026½	796·45	1,402·78	422·11	27·95	51·61	3·51
7/Jjj	10·67	9·47	5,269	493·81	1,526·27	247·92	23·24	72·04	4·71
7/Kkk	33·43	23·83	16,275	486·84	1,129·58	841·29	25·17	56·91	5·17
7/Lll	21·57	17·77	12,044	558·36	1,455·79	587·90	27·26	73·18	4·88
7/Mmm	13·53	9·57	5,706	421·72	1,054·02	284·91	21·06	53·05	4·99
Means	20·07	16·13	11,879·83	591·92	1,511·18	534·53	26·63	69·44	4·50

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow December to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow December to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	19	17·10	12,852	676·42	4,569·65	563·32	29·65	221·72	4·38
6/C ..	22·17	16·80	14,579	657·59	4,576·01	584·48	26·36	193·29	4·01
6/H .	24	20	16,815	700·62	4,329·47	782·07	32·59	208·05	4·65
6/Y ..	15	9	5,880	392·00	3,618·04	207·17	13·81	155·58	3·52
6/Ii ..	21	12·57	8,470	403·33	5,893·93	377·53	17·98	253·88	4·46
6/Ll .	26	17·67	9,428	362·61	4,465·39	357·67	13·76	169·88	3·79
6/Oo .	19·10	14·03	11,765	615·97	5,818·46	470·86	24·65	262·33	4·00
6/Pp .	14·17	9·63	6,006½	423·88	4,708·38	301·12	21·25	240·48	5·01
6/Rr	27·	16·63	15,137	560·63	6,432·16	640·57	23·72	270·68	4·23
6/Tt .	20·07	15·47	11,045½	550·34	6,194·01	451·44	22·49	274·54	4·09
6/Xx	24	17·97	13,813	575·50	5,544·70	614·26	25·59	240·98	4·45
6/Zz..	29·83	24·07	13,520½	453·25	5,190·22	677·83	22·72	248·57	5·01
6/Bbb	23	18·63	16,145½	701·98	5,863·16	627·87	27·30	256·51	3·89
6/Ccc	20·47	13·87	12,960	633·12	4,994·51	493·85	24·13	211·12	3·81
6/Ddd	25·20	18·03	14,605½	579·58	5,846·94	584·54	23·20	243·99	4·00
6/Eee	27·23	19·73	20,079	737·38	6,669·91	776·97	28·53	271·78	3·87
6/Fff	24·77	17·40	13,598½	548·99	6,295·71	553·02	22·33	261·94	4·07
6/Ggg	28·57	23·37	16,575	580·15	6,573·38	596·87	20·89	249·24	3·60
6/Iii .	24·33	20·90	12,002	493·30	6,617·70	484·07	19·90	273·35	4·03
6/Jjj	24·97	23·03	20,024	801·92	5,663·57	839·31	33·61	262·98	4·19
6/Kkk	35·43	29·67	24,030½	678·25	6,712·65	944·87	26·67	265·40	3·93
6/Lll	23·20	18·30	14,124	608·79	4,980·79	530·29	22·86	224·21	3·75
6/Mmm	9·07	8·17	9,151	1,008·93	May-Sept. 4,275·86	338·97	37·37	May-Sept. 159·99	3·70
Means	22·94	17·48	13,591·54	592·53	5,640·80	556·48	24·26	242·41	4·09

NARRUNG HERD TESTING ASSOCIATION.

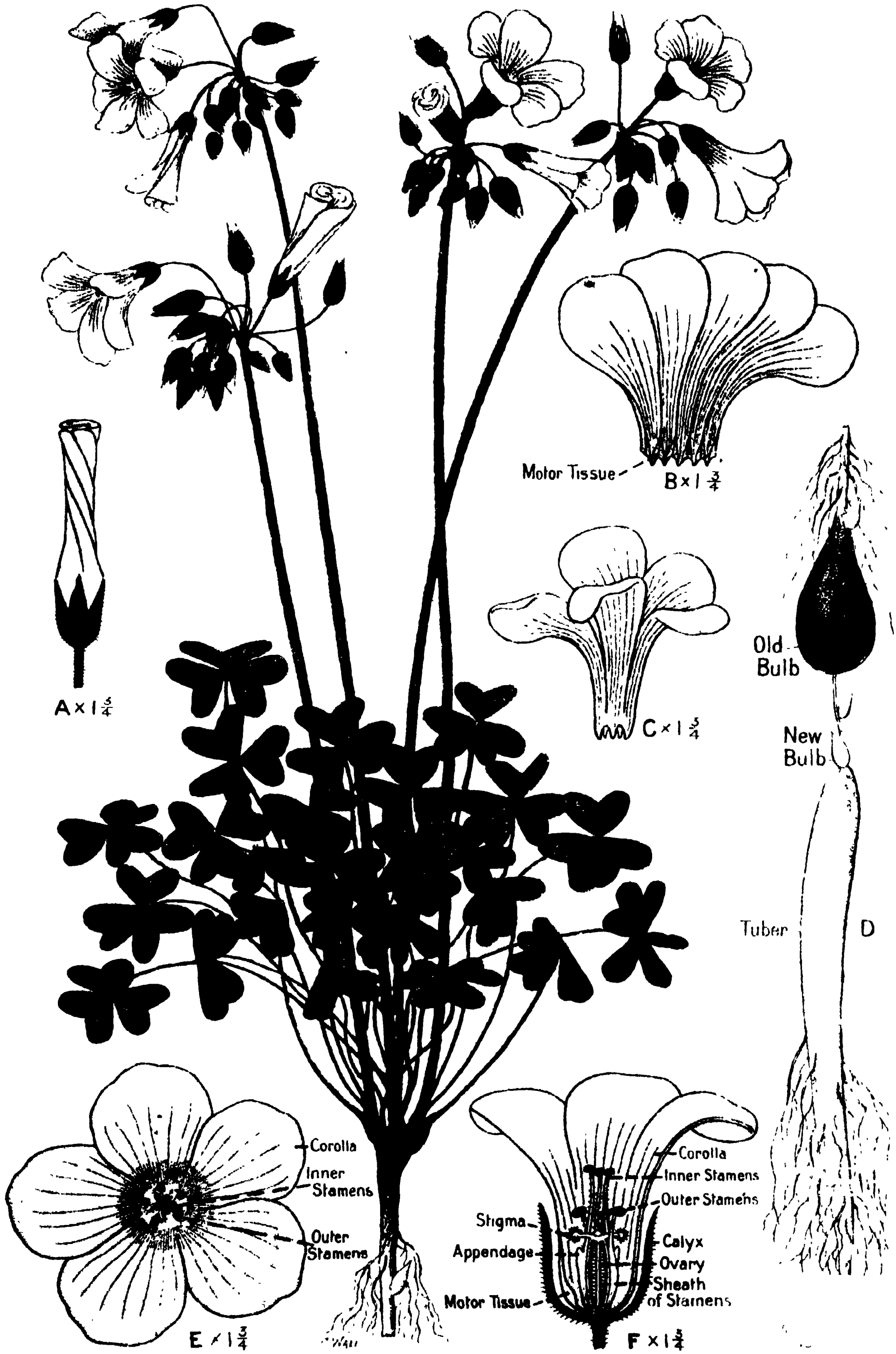
RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow October to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow October to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	35	32·30	21,019	599·44	5,650·93	1,025·95	29·31	285·87	4·89
5/D ..	32	30	18,600	581·25	5,102·54	920·31	28·76	270·26	4·95
5/E ..	39·53	30·16	22,292	564·18	5,123·73	1,134·21	28·71	268·92	5·10
5/P ..	35·10	31	27,345	779·06	7,679·87	1,295·14	36·90	367·65	4·74
5/R ..	70·30	65·10	49,154½	699·21	4,824·05	2,085·18	29·66	204·54	4·24
5/S...	16	14	7,215	450·94	5,440·45	378·26	23·64	269·38	5·24
5/Ee .	24	22·67	18,170	757·08	5,787·92	844·05	35·17	279·56	4·65
5/Gg .	13	10·47	4,991	383·92	4,152·26	254·94	19·61	204·64	5·11
5/Kk	16·17	12·40	7,288½	450·74	5,882·63	414·64	25·64	285·77	5·69
5/Nn	17	14·63	10,278½	604·60	5,569·24	528·28	31·08	271·03	5·14
5/Qq .	15	14	8,145	543·00	4,341·39	362·74	24·18	215·72	4·45
5/Rr	22	20	9,045	411·14	3,592·20	491·17	22·33	192·47	5·43
5/Ss .	17	16	7,680	451·76	4,073·99	372·43	21·91	203·05	4·85
5/Tt .	12	5·80	4,301	358·41	5,748·17	226·10	18·84	292·57	5·26
5/Vv .	21	21	17,550	835·71	6,390·24	719·23	34·25	269·29	4·10
5/Ww	23·50	23·50	13,717½	583·72	5,092·74	640·93	27·27	235·05	4·67
5/Xx	20	20	13,995	699·75	5,201·11	643·64	32·18	249·87	4·60
5/Yy	13	10·57	6,618	509·07	4,413·56	330·30	25·41	227·37	4·99
					Nov.-Sept.			Nov.-Sept.	
5/Zz..	28	14·93	11,448½	409·34	4,132·08	395·96	14·17	154·42	3·47
5/Aaa	18	14·50	11,417½	635·83	4,295·49	503·15	27·95	215·19	4·52
5/Bbb	17	14·37	9,146	538·00	3,616·54	470·76	27·69	186·10	5·15
					Jan.-Sept.			Jan.-Sept.	
5/Ccc	13	12	6,120	470·77	2,353·14	251·39	19·34	105·39	4·11
Means	23·53	20·43	13,888·05	590·30	5,168·66	649·49	27·61	247·86	4·68

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow March to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow March to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	25	21·13	11,165	446·60	3,342·17	576·63	23·07	180·92	5·17
9/B ..	14·77	10·40	5,007	338·99	2,691·58	235·71	15·96	127·28	4·71
9/C ..	12·20	10·63	7,255	594·66	2,836·52	320·25	26·25	127·67	4·41
9/D ..	24·80	21·10	13,253½	534·41	3,609·58	747·28	30·13	195·91	5·64
9/E ..	20	13·57	12,373½	618·68	2,875·77	597·68	29·88	136·28	4·83
9/F ..	20	17·67	14,554½	727·73	3,492·78	641·08	32·05	146·31	4·40
9/G ..	34·50	19·90	19,201½	556·56	2,784·11	929·67	26·95	147·05	4·84
9/H ..	20·37	17·37	16,635	816·64	4,450·13	707·30	34·72	187·40	4·25
9/I ..	36	30·37	22,704	630·67	1,937·62	912·19	25·34	79·35	4·02
9/J...	61	45·50	28,869	473·26	2,109·97	1,044·65	17·13	90·40	3·62
9/K .	23·37	19·80	10,434	446·47	2,025·17	448·72	19·20	97·74	4·30
9/L ..	29	21·87	13,406½	462·29	2,442·27	519·91	17·93	95·16	3·88
9/M .	18·27	8·90	4,845	265·18	338·15	214·75	11·75	15·36	4·43
9/M .	37	32·73	20,309	548·89	3,246·82	807·85	21·83	131·56	3·98
9/O ..	24·73	18·90	17,166	694·14	2,704·55	727·25	29·41	121·50	4·24
9/P ..	48·10	45·43	29,495½	613·21	2,501·30	1,303·64	27·10	114·44	4·42
					April-Sept.			April-Sept.	
9/Q ..	18	10·60	4,905½	272·52	2,375·81	230·08	12·78	112·87	4·69
9/R ..	9	6·07	6,137½	681·94	1,682·05	278·65	30·96	82·71	4·54
					May-Sept.			May-Sept.	
9/S...	10·53	8·83	9,373	890·12	2,439·99	412·88	39·21	107·38	4·40
9/T ..	14	14	10,605	757·50	3,077·28	487·93	34·85	140·22	4·60
9/U ..	15·63	12	8,220	525·91	1,989·69	423·69	27·11	104·86	5·15
					June-Sept.			June-Sept.	
9/V ..	10	9·47	6,165	616·50	1,741·45	317·71	31·77	90·02	5·15
9/W .	23	20·40	21,265½	924·59	—	926·52	40·28	—	4·36
Means	23·88	18·98	13,623·72	570·48	2,762·27	600·52	25·15	127·09	4·41



SOUR SOB (*Oxalis cernua* Thunb.

A.—Unopened flower showing the twisted corolla. B.—Corolla opened out.
C.—Corolla showing bases of petals. D.—Lower portion of plant.
E.—Flower viewed from above showing arrangement of stamens and pistil.
F.—Flower in vertical section.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

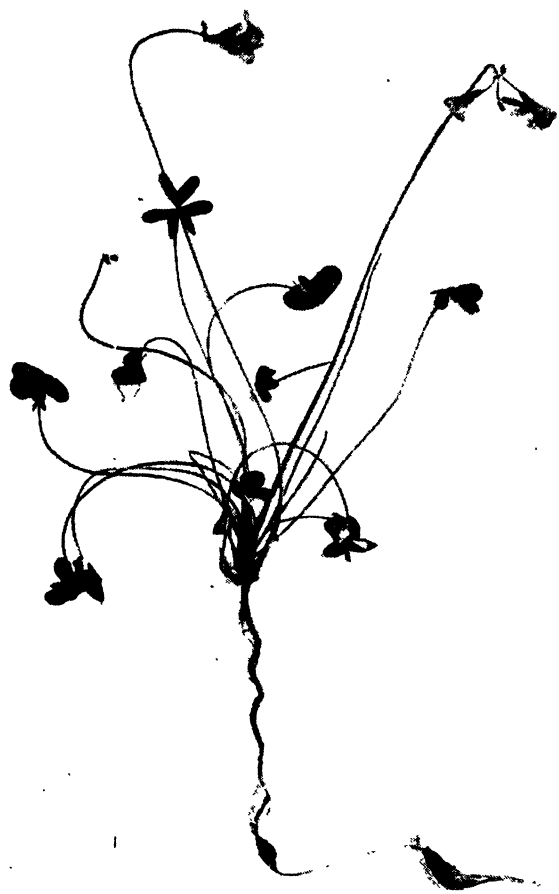
[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 9.—SOURSOB.

Oxalis cernua, Thunb.

I. INTRODUCTORY REMARKS.

The Soursob or *Oxalis cernua* is an introduced bulb-forming plant, native to South Africa, but now so abundant and well known that it requires no introduction to the residents of this State. Few persons will be found to whom it is not



[*Photo. by A. R. Hickinbotham.*

Figure 1.—Photograph of entire plant of *Oxalis cernua* showing the underground parts, viz., rhizome, tuber, and developing bulb.

familiar, both as a weed and as a more than generous contributor to the rural colour scheme during the winter and spring months of the year. There are not many plants which thrust themselves upon one's notice as forcibly as the Soursob,

D

the sun-opened flowers of which impart their brilliant yellow colour literally to thousands of acres of land on the plains and hillsides, giving to the latter the appearance of being daubed and smeared with yellow paint by the brush of some Brobdingnagian artist. One may note, in passing, the remarkable scenic effects produced in this country by certain naturalised alien plants, and the kaleidoscopic changes in the colour of the landscape, brought about by the successive flowering of the different forms. In the large-scale process of yellowing of the countryside Soursob is assisted by the Capeweed (*Cryptostemma calendulaceum*), which forms dense mats in places, and whose somewhat paler flowers, formed close to the ground, add their quota of colour to the scene; in the hills there is the Common Broom (*Cytisus scoparius*), giving place, here and there, to the more sombre yellowish brown tints of the Furze, or Gorse (*Ulex europaeus*), an introduced leguminous shrub with spiny leaves. As the season advances, the yellows give place, in parts, to the violet blue of Salvation Jane, the "Patterson's Curse" of the Eastern States (*Echium plantagineum*), almost as lavish as the Soursob in its contributions of colour. Still later, in some parts of the hills, remarkable snow-white effects are produced by the Rock Lily (*Ornithogalum thyrsoides*).

Apart from its importance to agriculturalists as a weed, and to sheep-owners as a source of trouble with stock at certain times of the year, the Soursob is of interest for a variety of reasons. In fact, the plant is, in many respects, a remarkable one. Its general habit and life history both present unusual features; and in structure, no less than in physiology, it exhibits many peculiarities of interest and importance. Consequently, it is proposed to deal with *Oxalis cernua* at somewhat greater length than has been deemed necessary in the case of the weeds already described in the present series of articles, especially since not much has been written about the habits of the plant, and because a knowledge of these may prove to be of assistance in attempting its eradication and control.

*II. HISTORY OF THE PLANT.

The cultivation of species of *Oxalis* as ornamental plants appears to date from about the middle of the seventeenth century, the first introduced species cultivated in England being *Oxalis stricta* from North America in 1658. The next record is *O. speciosa* from the Cape of Good Hope, really a variety of *O. variabilis* of which the type was not introduced until about a century later. A very large number of South African species was brought to England towards the close of the eighteenth century, most of them during the last decade. There is evidence, however, that *O. cernua* was introduced before this, and that it was, in fact, grown during the early years of the latter half of that century. Under the name of *O. caprina* the plant was described and illustrated in colour in the Botanical Magazine (No. 237) in 1793, and it is stated there to have been "cultivated by Mr. Miller in 1757." By 1798 *O. cernua* was listed in European catalogues as a garden variety.

As regards its early history in South Australia, there appears to be little doubt that it was introduced intentionally as a garden bulb in the very early days of the colony. It was almost certainly brought from the Cape Province of South Africa, of which it is a native, though we have no record as to the person actually responsible. The plant appears to have been introduced prior to the establishment of the Botanical Gardens in Adelaide in 1855, and in the first catalogue of plants

*For much information dealing with the early history of Soursob in South Australia the writer is indebted to Mr. H. C. Trumble, M. Agr. Sc., of the Waite Agricultural Research Institute.

under cultivation there, issued in 1859, the Superintendent (G. W. Francis) recorded it amongst those grown. The late Mr. J. G. O. Tepper, writing in the "Garden and Field" in September, 1883, stated that the first he ever saw occupied a corner in a garden near Lyndoch some 30 years previously (*i.e.*, about 1853):—

"... close by a well, and highly prized by the occupiers. Later the cottage and garden were abolished, and the site with the adjoining land cultivated and sown with wheat, &c. The farmer tried all his skill in getting rid of them by ploughing, mowing, digging, hoeing repeatedly, with the result that, 20 years after, about 1·2 square chains were occupied by it, or a little more."

In the Flora Australiensis, of which the first volume was published in 1863, Bentham made no reference to *Oxalis cernua*, as he almost certainly would have done had it then become naturalised to any marked extent in this State; yet, at the time of Mr. Tepper's report (1883), the plant had already become regarded as a serious weed of fairly widespread occurrence. Evidently the plant escaped from cultivation some time between 1860 and 1880, most probably during the early sixties.

Incidentally, the weed during the nineteenth century was known as "Soursops," presumably on account of the watery or soppy nature of the foliage and stems; "Soursob" and "Soursobs," which nowadays are in more general use, are doubtless corruptions of the earlier name. In September, 1885, the "Garden and Field notes:—

"... a fellow who wants £500 to tell farmers how to kill the Soursobs or *Oxalis*. Well, now, we will tell how to do it and want no reward."

But despite the advice, gratuitous and otherwise, that has been given, and the measures that have been used for its eradication, Soursob now has a very extensive distribution throughout South Australia, and is widely spread, also, in Victoria. But it does not occur as a weed to any appreciable extent in the other States of the Commonwealth.

III. THE SYSTEMATIC BOTANY OF *OXALIS CERNUA*.

Botanical and Vernacular Names.—The name *Oxalis* comes from the Greek *oxus*, meaning "sour" or "sharp-tasting," and is due to the presence of organic acid in plants belonging to this genus; *cernua* means "nodding," or "drooping," and is on account of the sleep movements exhibited by the foliage and flowers of this species, which is referred to by some French writers as the "Drooping Oxalis" (l'Oxalis penchée). The name "Wood Sorrel" is very generally applied to plants of the genus *Oxalis*, but belongs in particular to the English species, *Oxalis Acetosella*. As regards *O. cernua*, the names most commonly applied to the plant are "Soursob," "Soursobs," or "Soursops," in this country, and "Bermuda Buttercups" in America.

The Family.—*Oxalis cernua* belongs to the *Oxalidaceae*, or Wood Sorrel Family, an assemblage of plants allied to the Geraniums and Pelargoniums grown in gardens, and characterised by having radially symmetrical flowers with five whorls each of five parts, a whorl of sepals, one of petals, two of stamens (rarely three), and a single whorl of united carpels. The Wood Sorrels differ from the Geraniums (family *Geraniaceae*) in certain structural details of the flower, and in the mode of dehiscence of the fruit. The stamens, in the *Oxalidaceae*, are united by their bases to form a ring surrounding the ovary, and the five styles of the carpels are free from one another; also, the fruit, though occasionally a succulent berry, is usually a capsule which splits along the dorsal suture of each of the five carpels, whereas, in the *Geraniaceae*, it usually breaks up into five one-seeded portions.

The family is made up of* 7 genera and approximately 870 species, all but 79 of the latter being contained within the large genus *Oxalis*. Of the other genera the largest is *Biophytum*, with 51 species of herbs distributed throughout the

tropics of Asia, Africa, and America, and of interest in having leaves which, like those of the Sensitive Plant (*Mimosa pudica*), are sensitive to the touch. Next comes *Sarcotheca*, with 15 species of trees and shrubs in the Malay Peninsula and Archipelago, and *Hypseocharis*, with 7 species of herbs belonging to Peru, Bolivia, and the Argentine. The three remaining genera are *Averrhoa, Eichleria,* and *Dapania,* each with 2 species, the first being trees or shrubs, and cultivated in the tropics for their berry fruits, the last two being natives, respectively, of tropical America and south-eastern Asia.

The Genus.—*Oxalis*, with approximately 791 species, is by far the largest and most important genus of the family. It is distinguished from the others by having flowers with 10 stamens, arranged in two whorls of 5, 5 carpels united when mature, dehiscent capsular fruits, and leaves usually with 3 digitately arranged leaflets. The number of leaflets is more than 3 in a few species, and it is sometimes reduced to 1, or even 0, in rare cases, the petioles then becoming expanded to form *phyllodia*, comparable with those of our Australian Wattles, and carrying on the function of the leaflets. Other characters are the regular flowers, the twisted petals, and the peculiar method of discharge of the seeds. These are provided with a seed coat (*testa*), of which the outer layer is fleshy and forms an aril which separates elastically from the inner hard layer, in such a way that the seed is forcibly discharged from the fruit.

A character very common in the genus, and met with also in some other families, is the occurrence of variation in the relative lengths of styles and stamens of the flowers. This variation does not occur in *Oxalis cernua,* but it is to be seen in a good many other species including one, *O. compressa,* which we shall describe in due course, and so is worthy of consideration at this stage. Examination of an *Oxalis* flower in section (Figure F., of coloured plate) shows that the terminal parts of the stamens and pistil occupy three distinct levels. Taking the Soursob flower as an example, it will be seen that the uppermost level is occupied by the anthers belonging to the inner whorl of stamens, and the lowermost level by those of the outer whorl, the middle level being taken by the stigmas, which terminate the styles of the pistil or carpels. This arrangement may be represented thus:—

Inner anthers
Stigmas
Outer anthers,

and appears to be constant in the case of *Oxalis cernua.* But in a number of other species it is possible to distinguish three types of arrangement, viz.—

(*a*)	(*b*)	(*c*)
Inner anthers	Stigmas	Inner anthers
Stigmas	Inner anthers	Outer anthers
Outer anthers,	Outer anthers,	Stigmas,

all occurring in different flowers of the same species of *Oxalis.*

This trimorphism of the flowers is connected with their mechanisms of cross-pollination, which is effected, in some species by bees, in others by butterflies. It has been found by experiment that a given type of flower, *e.g.*, a long-styled or (*b*) type, is most readily pollinated with pollen from another flower in which anthers occupy the same level as the stigmas of the first. In other words, a flower of the (*b*) type is pollinated more easily from (*c*) and (*a*) than from other (*b*) flowers; a (*c*) flower more easily from (*a*) and (*b*) than from other (*c*) flowers; and an (*a*) flower more easily from (*b*) and (*c*) than from other (*a*) flowers.

A few species of *Oxalis* produce, in addition to normal open flowers, a certain number of small *cleistogamous* flowers, which do not open and are self-fertile.

*According to Knuth in the *Pflanzenreich.*

The genus is represented in most warm parts of the world, but the two main centres of distribution are South Africa and tropical and extratropical South America. Two species are native in Australia, one, *O. corniculata,* being almost cosmopolitan, the other, *O. magellanica,* occurring in New Zealand and South America as well as in Victoria and Tasmania. In addition to the native ones there are some half-dozen introduced species in Australia. In this State the genus is represented by, in addition to the native *O. corniculata, O. cernua, O. compressa,* and *O. variabilis,* all belonging to South Africa.

With one exception the South African species are all bulbous perennials, either with or without an aerial stem, and with alternate or fascicled leaves and scape-like peduncles of flowers. On the other hand, some of the South American forms are tall and shrubby.

The Species.—In many of the bulb-forming species of *Oxalis* there is a differentiation of the bulb scales into outer ones serving for protection, and inner ones concerned in storage. Among this group of species, those in which the flowers are borne in false umbels constitute the section *Cernuae* of the genus. Within this section, those with yellow flowers comprise a subsection, the *Eucernuae,* which includes, amongst others, *O. cernua.* The characters which distinguish *O. cernua* from the other members of this subsection are (1) the presence of crowded bracts at the base of the umbel of flowers, (2) the stalked flowers, (3) the relatively robust habit of growth, (4) the rounded (not flattened) leaf-stalks, and (5) the presence of a few hairs on the undersides of the leaflets.

Description of O. cernua.—An almost glabrous perennial, with an annual, vertical, subterranean rhizome 2·8 mm. thick at the ground level but tapering below into a fine thread-like extension by means of which it is connected with the parent bulb, or with a fusiform translucent structure formed by tuberisation of one of its roots; rhizome with numerous hair-like adventitious roots, whitish, mostly unbranched, with 1 to several bulbils in the axils of scale-leaves, producing numerous leaves at the ground level, or sometimes extending horizontally for a short distance and bearing crowded leaves towards its termination; leaves all basal or subterminal, each with a short flattened leaf base, a long cylindrical petiole up to 13 cm. long, and three terminal digitate leaflets; leaflets obcordate, 2-lobed, 1·4 cm. broad, often marked with small purple spots; flowers yellow, drooping, 3-16 in umbels on long radical peduncles; sepals 6 mm. long with two orange calli at tip; petals 25 mm. long; inner stamens long, each with a staminodial appendage towards the base; styles short; capsule oblong-acuminate, rarely matured in Australia. Fl.—June-October.

IV. SOME PECULIARITIES OF *OXALIS CERNUA.*

1. *Delicacy of Plant.*—Among the outstanding features of the Soursob is the very great delicacy of the foliage and other parts as compared with those of most other plants growing in similar situations. There is an almost complete absence of woody fibre from the tissues, and of heavily cutinised membranes from the surface layers of the exposed parts. The softness of the tissues is associated with an exceptionally high water content, amounting to about 90 per cent. of the weight of the fresh plant.

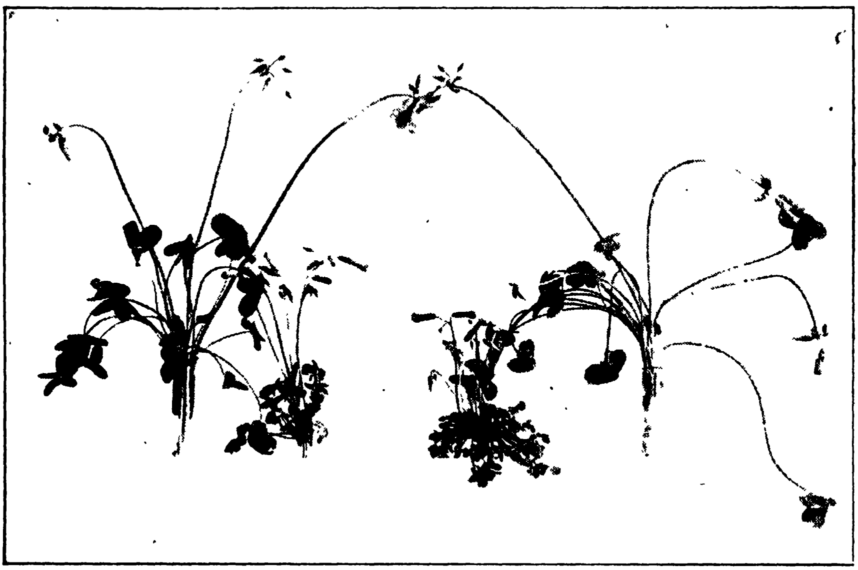
2. *Hardiness.*—Despite the extreme delicacy of its structure, the plant is exceptionally hardy when considered from the point of view of its ability to hold its ground in competition with other plants, and to spread from year to year. Within certain limits it is very resistant to adverse conditions; the smallest amount of moisture will enable the plants to live and continue to flower for days after they have been pulled out of the ground, and detached fragments in the ground have marked regenerative power. Moreover the plant appears to be adapted to a wide range of temperature and illumination.

3. *Reproduction.*—Another remarkable character is the almost complete abandonment, in this country at least, of seed production as a means of propagation, which, in *Oxalis cernua,* seems to be effected solely by means of the underground bulbils. The high order of efficiency achieved by this method of reproduction is

evidenced by the wide distribution of the plant throughout the State, the density of its growth on infested areas, and by the difficulty of coping with it as a weed in the garden.

4. *Bulb Formation.*—The production of bulbs is, in itself, an unusual character for a plant of the net-veined or dicotyledonous type. Bulb formation is common enough in the vegetable kingdom, but, with few exceptions, is confined to members of the parallel-veined or monocotyledonous series of families—Lilies, Amaryllids, Irids, &c.—plants far removed from *Oxalis* in the system of classification, and differing fundamentally both in structure and affinities.

5. *Tuberous Roots.*—Connected with the development of the underground bulbs, there is formed an especially interesting type of root system. Certain roots become swollen and tuberous due to the absorbtion and storage by them of large amounts of water. These tuberous roots are sweet to the taste, and contain a certain amount of sugar in addition to their large reserves of water; they are edible, and, in some countries are said to be boiled and eaten with milk. They appear to play an important part in the nutrition and development of the bulbs. Their stores of water render the young bulbs largely independent of soil moisture,



[*Photo. by A. R. Hickinbotham.*

Figure 2.—Photograph showing sun plants (centre) and shade plants of *Oxalis cernua*. Note the greater size, longer leaf-stalks and peduncles, and larger leaflets in the case of the shade plants. Compare also, in Figure 3, Nos. 16 and 18, with the other specimens photographed there.

and enable them to complete their development at leisure, so to speak, after the surface layers of the soil have become comparatively dry. But the tubers also have another and important function, in that they draw the bulb, and the lower part of the stem with its bulbils, down into the deeper and moister parts of the soil. They are, in short, *contractile organs*, and possess a very efficient and ingenious mechanism of contraction, which is brought into operation by the gradual drying of the soil. The behaviour of these contractile roots accounts, we shall see, for some of the difficulties associated with the eradication of Soursob; it also helps to explain the local spread of the plants.

6. *Sensitiveness to Light.*—Another noteworthy feature of the Soursob is its extraordinary sensitiveness to light, a sensitiveness which reveals itself in a number of different ways. Perhaps the most obvious effect of sunlight is that produced upon the flowers, which are wide open and face the sun during bright sunshine,

and become closed and drooping during darkness, and during dull, cloudy, or rainy weather. The leaflets also are expanded during the day and folded at night. These "sleep movements," as they are called, are affected, in response to variations in the intensity of illumination, by special movable joints termed *pulvini*, situated at the bases of the stalks of leaves, flower-clusters, and individual flowers, and at the junctions of the leaflets. Motor tissue occurs also along the main veins of the leaflets, and at the junctions of the lower parts of the petals, towards the base of the corolla tube.

Equally striking are the effects of different intensities of light upon the general habit of the plants, though, in this respect, *Oxalis* differs from most other plants in degree rather than in kind. Sun plants and shade plants of *Oxalis cernua* differ from each other markedly in size, length of stems, leaf-stalks, and peduncles, and in the size, texture, and hairiness of the leaflets. Moreover the effects of unilateral stimulation are well shown by differences in symmetry between plants situated, respectively, in the open and in the shade. The former are strictly radial as regards the orientation of their leaves in relation to the terminal bud of the stem, which is vertical in its direction of growth, whereas the latter assume, in varying degrees, a dorsiventral habit. In some cases the aerial part of the main stem extends horizontally along the ground for a distance of a foot or even more, and then ends in a crown of leaves, all directed upwards, that is, towards one side of the now horizontal axis (Fig. VI.).

A third indication of the sensitiveness of the plants to light is afforded by the wide range of intensities of illumination to which the Soursob appears to be adapted. Vigorous growth takes place both in strong sunlight and deep shade, the differences in size, form, and texture between the leaflets of sun plants and shade plants being doubtless correlated with this range of light receptiveness. It is possible that the assimilatory capacity of the leaves is increased in the case of plants growing in the shade; the lower surface layer, or epidermis, of the leaflets is composed of large papillate cells, which may have some condensing action on the diffuse light rays in dull and shady situations. One very noticeable feature of shade plants, in addition to those mentioned, is the paucity of flowers formed by them as compared with plants growing in sunlight. Light seems to be as necessary for the production, as it is for the opening, of flowers; in a shaded patch of plants, those situated on the outskirts are the only ones, usually, in flower.

7. *Acid Metabolism.*—Perhaps the most characteristic feature of the Soursob, in common with other species of *Oxalis*, and, in fact, of the family *Oxalidaceae*, is the sourness of the foliage and stems due to the presence of a well-developed organic acid metabolism, to which the plant owes its generic name, from which, in turn, is derived the name of the contained acid, viz., *oxalic acid*. This substance is poisonous, about half an ounce being regarded as a fatal dose for an adult human being, though death has resulted from as little as one drachm, and recovery from as much as an ounce and a half after prompt treatment. Even in the relatively weak concentrations in which it occurs in Soursob (about 0.7-1 per cent. of free acid), oxalic acid does, at certain times, cause poisoning when sheep, and especially ewes in lamb, are heavily grazed on Soursob pastures. Oxalic acid combines very readily with lime to form the insoluble calcium oxalate, and, when taken internally, is apt to cause profund disturbance of the calcium metabolism of the body by removing this element from solution in the blood and other fluids. Ordinarily the reserves of calcium in the body are such that sheep can ingest even large amounts of Soursob without suffering any ill effects. It is usually only at times when a big demand is being made on the calcium reserves that the system becomes highly susceptible to the poisoning action of a Soursob pasture. Such a demand exists in the case of pregnant ewes, in which large amounts of lime and phosphorus are needed for the development of the bones of the foetus; and so we find that ewes in lamb often show symptoms of Soursob poisoning on pastures on which other sheep remain unaffected.

An organic acid metabolism is rather common in some plants, notably in succulents, and the subject of acid formation has been considered in the past chiefly from the point of view of its relation to the succulent habit. It is well known that plants living under especially dry and arid conditions show certain structural differences from those inhabiting situations where the climatic conditions are more moderate. These structural modifications take place usually in one or other of two directions; in some plants there is an internal development of woody fibre and sclerotic tissue, combined with various devices for the reduction of transpiration or external water loss, such as, for example, the development of heavily cuticularised surface membranes, and of coverings of hairs, &c., the depression of the stomata or breathing pores of the leaves below the surface level, the reduction in size, and sometimes complete abortion of leaf-blades: a series of modifications resulting in a type of vegetation termed *sclerophyll.* In other cases the leaves or stems, or both, become thick and fleshy due to the internal development of large amounts of water storage tissue; the internal air-space systems are relatively small, the surface or epidermal layers showing varying degrees of cuticularisation, and sometimes themselves assuming the function of storing water. Such plants are called *succulents,* and are of two main kinds, *desert succulents* and *halophytic* or salt marsh types of *succulents.* Thus, desert and semi-desert plants may be of either the sclerophyll or the succulent type.

The physiology of desert succulents has led to a good deal of investigation and discussion, and there is an extensive literature dealing with the subject. It has been suggested that, whereas sclerophyll results from a type of metabolism in which sugars are converted into celluloses and other similar condensation products, succulence is the expression of a different kind of metabolism, one in which the sugars are transformed into pentosans such as mucilages and gums, substances with marked tenacity for water. But the known facts do not altogether support this view. It is found that succulence is a difficult thing to define, and that there is no single character by means of which it can be sharply distinguished from other types of habit. But it is recognised that the succulent habit is usually associated with certain marked peculiarities, not merely of structure, but also of metabolism and respiration.

Numerous investigations have shown that, in general, succulent plants possess a well-marked acid metabolism, and that there is a diurnal periodicity in the quantities of organic acids present in their tissues at different times of the day. Usually the acid content is lowest towards nightfall, and increases steadily during the evening, attaining a maximum value some time before sunrise in the early morning. During the day, under the influence of bright sunshine, the acids tend to disappear from the leaves, the amount present in the late afternoon being considerably less than at the commencement of the day. Associated with this diurnal change there are certain peculiarities in the respiratory gaseous interchanges; the carbon dioxide (CO_2) given off by the plants during darkness is much less in amount than the oxygen (O_2) taken in, whereas in normal respiration these values should be exactly equal. The reduced CO_2 output is accounted for in the case of succulent plants by the formation of organic acids, for which a supply of CO_2 is needed, that is to say, of the CO_2 formed in respiration only part is got rid of, part being retained and used in the synthesis of the acid, the decomposition of the acid during exposure to sunlight being accompanied by the formation of CO_2 as a by-product. Consequently, the organic acids present in the leaves of succulent plants are often regarded as constituting a reserve of CO_2 for purposes of carbon assimilation during the day.

Owing to the thin texture of its leaves and the great delicacy of its other parts, it is difficult to regard *Oxalis cernua* as a succulent plant in the usually accepted sense of the term, though it undoubtedly does show some tendencies in this direction. Unfortunately there are no data available as to the pentosan content of the plant, nor have we, as yet, any information as to the respiratory gaseous

exchanges. On the other hand the plant does possess a marked acid metabolism, and, as we shall presently see, there are grounds for believing that there is, in the course of this metabolism, a diurnal periodicity comparable with that found in plants of more typically succulent habit.

V. MORPHOLOGY AND VEGETATIVE LIFE CYCLE.

An account of the habits and vegetative life cycle of *Oxalis cernua* was given in 1914 by Ducellier, who made a careful study of the plant at the School of Agriculture at Maison-Carrée, in Algeria. According to Ducellier the life cycle in Algeria is distinguishable into three phases,—a first phase represented by the germination of the bulbil to produce, on one side, a vertical rhizome bearing buds, roots, and leaves, and on the other a crown of roots; a second phase corresponding to the tuberisation of one of the roots and the appearance of flowers; and a third and last phase, which begins with the appearance of a "primary bulbil" at the end of the tuberous root. During this last phase there takes place the transformation of the buds of the rhizome into "secondary bulbils," the "résorbtion" of the tuber ("tubercule") bringing about a natural displacement of one or more bulbils, the end of flowering, the fruiting of some capsules, and the destruction of the rhizome leading to complete independence of the bulbils. The following is a translation of the main substance of M. Ducellier's paper:—

Oxalis cernua, Thunb., a native of the Cape of Good Hope, is common in some cultivated areas in Algeria, *e.g.*, in the orangeries, where, during winter, it forms rather dense infestations. It spreads rapidly, and to such an extent that its presence is feared in gardens and orchards. It is found, to-day, not only in North Africa, but in Spain, France, Italy, Greece, Asia Minor, the Canary Islands, and in the Isles of Madeira. It is to be observed mainly near the sea, in places where the frosts are not severe, in valleys and on plains, where it seems to be perfectly adapted.

In Algeria, *Oxalis cernua* reproduces itself mainly by bulbils, which are mostly formed on the underground part of the stem. Seed is also produced, but in very small quantity.

The First Phase.—The bulbils are small conical structures with a rounded base, and consist of a series of white scale-leaves borne on a flattened axis, and arranged one inside the other with a very small terminal bud in the centre. These scales, which are of a shape becoming smaller towards the centre, are covered externally by two or three other brown scales thickened longitudinally towards the middle, and forming a rather resistant protective envelope. The bulbils vary greatly in size, the largest measuring up to 30 mm. in length, and 10 to 12 mm. in breadth, in rich garden soil. These bulbils weigh up to 2 or even 2½ grams when fully mature. The bulb-scales contain important starchy reserves which gradually disappear as the stem develops.

Germination of the bulbils begins when the earth is moistened by the first autumn rains; in fact, very little water is needed by these organs to produce stem and roots. The mature bulbs can be preserved for more than six months without appreciable loss of water (scarcely 1 decigram for the largest bulbils) if kept in a dry shady place. At the end of this time they will have produced short roots and stems.

In Algeria, it is towards the end of September, more generally in October, that the dormant life of the bulbils comes to an end. At this stage there emerges at the tip of the bulbil a slender stem which elongates rapidly, becoming gradually thicker as it approaches the soil level, where it may attain a thickness of 6-8 mm. The bud which terminates it expands and produces in a few days a rosette of trifoliate leaves.

The stem or rhizome is vertical; it bears numerous almost horizontal roots, and alternate scale leaves, each of which subtends a miniature bud which later grows into a bulbil. At the same time there appears, at the base of the parent bulbil, a series of roots which are stouter than those formed on the rhizome. They arise from the periphery of the axis, and emerge from between the lower bulb scales. These roots push their way obliquely into the soil for a distance which varies according to the hardness or richness, &c., of the soil. The length of the stem varies according to the depth at which the parent bulbil is situated; it does not seem to exceed 25-30 cm. even in places where the soil has been loosened to a great depth; it usually measures 10-15 cm., except, perhaps, in hard uncultivated ground, where it may be very short.

The Second Phase.—*Oxalis* quickly takes advantage of moisture in the soil, like all plants whose root systems develop in the superficial layers of soil. In order to appreciate this fact it suffices to dig carefully among a clump of the plants, towards the middle of November, for example: one is surprised to find, immediately below the bulbil, a tuber formed by the swelling of one of the roots inserted on the periphery of its flattened axis.

[*Photo. by A. R. Hickinbotham.*

Figure 3.—Photograph showing various stages in the development of *Oxalis cernua* from the bulbs and bulbils. Nos. 16 and 18 are shade plants from loose garden soil, all the rest are sun plants from hard uncultivated ground; 1-4, ungerminated bulbs and bulbils; 9-10, early germination stages; 5-8, development of the tuber; 12-16, contraction of the tubers; 17, showing branched rhizome; 18, shade plant from garden soil showing large tuber and very long thread-like rhizome; 19-20, germinating bulbs opened out to show the rhizome arising in the axil of a bulb-scale and bearing rudiments of bulbils.

Certain of these tubers measure up to 35-40 cm. in length, and 12-15 mm., sometimes, in thickness, when the plant is growing in loosened and fertile soil, *e.g.*, in vineyards and orchards. Plants may be found with two or more tubers, but this is rare, except where the plants have been injured, *e.g.*, by cultivation implements. The rhizome can, in fact, be broken, bruised, or completely severed from the tuber and bulbil; on the fragments of the rhizome there appear buds, some roots, even those of the rhizome, begin to swell and develop into tubers.

The tuber of *Oxalis cernua* resembles a small, much elongated salsify; it is transparent, and one can easily see, in the centre, the fibrovascular bundles of the root from which it developed, forming a white line traversing it longitudinally. The tuberisation of the root begins soon after the appearance of the leaves.

The tubers are very watery, soft, and brittle. Their taste is sweet. There is no doubt that these tubers, swollen with water of which they contain as much as 90 per cent., constitute a reservoir from which the plant will later draw the necessary materials for the development of its bulbils and fruits.

We shall note, in passing, the disproportion existing between that part of the stem near the tuber, and the tuber itself; it is sometimes in the ratio of 1 : 20; in fact, certain tubers attain more than 15 mm. in diameter in fertile soil, while the lower part of the stem, situated in the bulbil, does not measure more than ½ mm. in thickness. This peculiarity means that the stem separates from the tuber with the greatest ease at the slightest traction exerted upon it. One can pull up the stem without suspecting the presence of equally large tubers. The development of the tubers marks the end of the second phase of the growth of the plant, by which time the original bulbil has also produced the stem with both leaves and flowers.

The Third Phase.—In Algeria, *Oxalis* continues to grow during winter, and, if its development is carefully followed, there is to be seen appearing, below the bulbil and almost at the summit of the tuber, a bud, almost imperceptible at first, but soon enlarging rapidly. It is a new bulbil, which can grow to the size indicated above. As the bulbil grows the tuber empties itself gradually, and disappears after a short time, leaving in its place a small blackish shrivelled body, which also disappears in the course of the year. The tuber of *Oxalis cernua* is ephemeral; it develops and is "resorbed" in a short time, 2-3 months in Algeria, if the winter is mild (Fig. IV.).

After the appearance of the first bulbil, which may be called the *primary bulbil*, and before it has reached its full size, others develop on the stem, smaller ones which may be called *secondary bulbils.* The buds situated in the axils of the scale leaves of the stem are mostly transformed into bulbils, especially those nearest to the rosette of leaves. Their number and size (Fig. IV.) varies much, and evidently depends on the moisture present in the superficial layer of soil, and the nutritive materials to be found within reach of the plant. Under favourable conditions it is possible to count 20 bulbils per plant. One may well imagine the number present in the soil at the site of a patch of *Oxalis* plants.

As the wet season passes the bulbils steadily ripen; at first white, they later assume a chestnut-brown colour when fully mature. The taste of the bulbils is quite different from that of the tubers. Instead of being sugary like the last, they are acrid. Their acridity, disappears, however, on boiling.

Oxalis cernua flowers early on the Algerian littoral, from about the end of December. The flowering continues right up till the end of March or April, according to the weather conditions. The number of flowers varies greatly; certain plants produce many hundreds of flowers, while others do not flower at all. In all cases very few of the flowers are fertile; one or two seeds are rarely found in the half-developed capsules.

When the substances stored in the tuber make their way towards the bulbils, the tuber shrinks and becomes pushed in like a concertina of which one side is kept fixed. The lower part of the tuber being, in fact, fixed in the soil, the tuber, in gradually contracting, slowly draws downwards the stem, which elongates and becomes stretched out below into a very delicate thread.

Likewise, the bulbil fixed at the upper part of the tuber travels a certain distance, as will readily be understood, since the remains of the old bulbil, near which it is formed, does not change its position. This distance equals, in some cases, 25 cm. Moreover, the displacement of the bulbils can be verified in another way, for there is left, in the soil, and very distinctly preserved, the nearly cylindrical imprint of the original place occupied by the tuber when at its maximum size.

Of the other bulbils, one or two situated in the lower part of the stem follow and travel a certain distance less than that traversed by the first. These bulbils evidently cease to move when the tuber is exhausted. This constitues a peculiar habit, uncommon, it seems to us, among plants, of the displacement of organs concerned in multiplication. This method allows the Oxalis to invade, little by little, large areas, even when it does not produce any seeds, as is the case with the variety with double flowers,*

*A form with double flowers is very common in the Mediterranean region, but does not occur in South Australia.

which does not form fruits. The displacement of the bulbils takes place obliquely, almost horizontally in some cases. There are, then, always some bulbils which move away from the centre of a clump of plants. We shall recall that the seeds of *Oxalis* are projected far from the capsule which contains them by their arils during dehiscence. *Oxalis cernua* thus possesses two natural methods of propagation independently of the transport of bulbils and seeds by man.

At the onset of the first warm weather, in April on the Algerian littoral, the leaves begin to disappear, their leaflets becoming detached and falling together with the petioles, followed then by the peduncles. If the axillary buds are not transformed into bulbils they disappear (*Oxalis cernua* can form aerial bulbils). The rhizome and the remains of the tuber are the last to disappear. At the end of some time the decomposition of these materials is complete, and, in place of a plant of *Oxalis cernua*, there are only bulbils placed at variable depths, and quite independent of one another.

The life history of the plant in South Australia appears to correspond very closely with that in Algeria, as described by Ducellier, when due allowance is made for the reversed seasonal conditions in the Southern Hemisphere. Here, as in Algeria, germination of the bulbils and early growth follows the first autumn rains, and so takes place, in this country, during April and May. The appearance of the plant is heralded by a peculiar sponginess of the ground, due to the upgrowth towards the surface of the innumerable stems formed by the germination of the underlying bulbils. The stems push their way upwards, and many of them show signs of having encountered much resistance in the course of their ascent through the soil. The surface of the ground becomes covered with small pimple-like elevations, and it feels springy when walked upon. Examination of one of these pimples reveals the terminal leafy bud with its leaflets folded in repose, just below the surface of the soil. Soon it bursts through and unfolds its rosette of leaves. From now on growth continues and, by the end of June, flowers have begun to appear, and these become more numerous and conspicuous during the succeeding months. The tubers, which have meanwhile begun to develop, reach their maximum size usually during July, and, by the middle of August, most of them have begun to contract. Growth and flowering continue during the spring, but the plants die off rapidly after the onset of the dry weather, except in a few favoured situations. By the end of October most of the Soursob has disappeared, the entire period of growth occupying about 6 months of the year.

Though Ducellier describes some of the tubers as being about 15in. long, they are usually smaller than this. Most of those observed by the writer were under 8in., usually 4-6in. in loose garden soil and 1-3in. in hard ground. In a number of cases observed one of the lateral roots of the tuber was itself tuberous, and tuberisation of one of the adventitious roots of the rhizome was also noticed in one instance.

The rhizome was unbranched in the great majority of the specimens examined, but in a few cases it bore 1, or rarely 2, lateral branches. Evidently the buds of the rhizome can develop either into bulbils, or into stems similar to the first.

As regards the bulbils, there is one point, it seems to us, that Ducellier fails to emphasise sufficiently, and that is the distinction between what he respectively terms the "primary" and the "secondary" bulbils. There is an important morphological difference between these, and a still more important physiological one. The first is that they arise from axes of different degrees, the "primary" bulbil from the greatly shortened bulb axis which, since it represents the main stem of the plant, is an axis of the first degree; the "secondary" bulbils from the vertical rhizome or stem, which is a lateral branch of the first, and, consequently, an axis of the second degree. Since the "primary" bulbil is usually larger than the "secondaries," it will be permissible, for purposes of greater emphasis, to distinguish them respectively as the *bulb* and *bulbils,* reserving the latter term for the "secondaries" alone. Moreover, the bulb appears to be terminal whereas the bulbils are lateral structures. The physiological difference is even more important. The bulbils are organs of multiplication; they give rise to new plants or

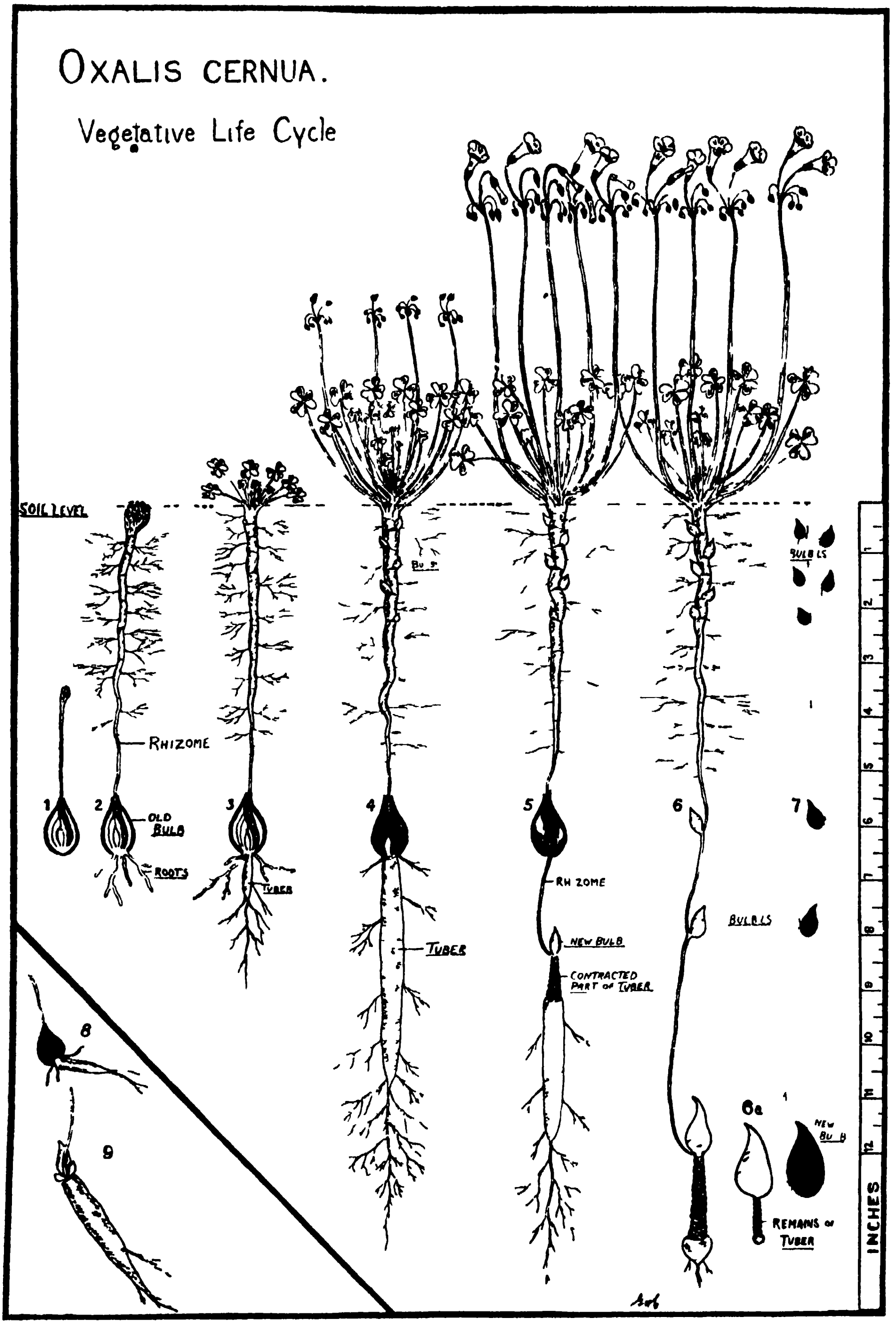


Figure 4.—Diagram to show the vegetative life cycle of *Oxalis cernua* (1) Germination of bulb, upgrowth of rhizome and terminal bud; (2) formation of roots at base of bulb, appearance of shoot at surface; (3) commencing tuberisation of one of the bulb roots; (4) tuber fully formed; (5) contraction of tuber and descent of bulb and rhizome in the soil; (6) contraction almost complete, enlargement of bulb and of the bulbils of rhizome; (6a) contraction complete; (7) death of plant, bulb and bulbils left in soil; (8) germinating bulbil showing oblique direction of tuber in soil (see also No 7, Figure 3); (9) tuber with one or two small bulbs below the larger terminal bulb

individuals. Not so the bulb; it merely perennates the plant, that is, it continues the growth of the one plant or individual during each successive season. The Soursob is a perennial plant, but the part appearing above ground is merely a lateral branch which dies at the end of the growing season; the truly perennial part of the plant is in the soil, and is, in fact, the bulb itself. The bulb formed at the end of the growing season was already present, in a primordial form, in the parent bulb or bulbil which underwent germination at the commencement of that season; and it contains the primordium of the bulb which will form at the end of the next season. Without embarking upon a philosophical discussion, we may accept *organic continuity* as a criterion in deciding whether a given collection of living units constitutes a single individual, or a number of separate individuals. If the units are all connected together by living matter without any break of continuity, then we may regard the system as one individual; if no such continuity exists, then each unit is an individual separate from the rest. In terms of this conception the bulb represents the continuation of one perennial plant or individual, whereas the bulbils, once they are separated from the parent plant, represent the commencement of a new series of individuals.

If, then, we regard the life cycle as beginning with the germination of a bulbil, it is possible that *Oxalis cernua* does not flower during the first year of its growth. Some of the plants, Ducellier points out, do not produce flowers, and these plants arise from small *bulbils. It seems likely that these non-flowering forms may represent the first year's growth of plants formed from bulbils, and that the larger flowering forms are older plants developed from bulbs.

This distinction between bulbs and bulbils may explain some of the difficulties met with in attempting to eradicate Soursob by cultivation methods. Most of the bulbils are formed in the upper 3in. or 4in. of soil, though one or two are usually found at a deeper level. The bulbs, however, are situated much more deeply, being 6-12in. or so from the surface, below the level, not only of cultivation, but even of deep ploughing. If the cultivation methods have not prevented the formation of these bulbs, the re-appearance of the plants the following year is inevitable. The presence in the tubers of sugars, in addition to water, makes it far from impossible that maturation of the bulbs may be effected even when the surface growth is destroyed, once the tubers have been allowed to reach their full size. These considerations suggest that eradication measures should aim at preventing these tubers from contracting, and so from withdrawing, with their developing bulbs, out of reach of the cultivation implements.

This does not necessarily mean that surface cultivation is useless. Even if the tuber does contain sufficient reserve material to develop a bulb when the aerial parts have been severed, the bulb so formed would doubtless be smaller than otherwise, and the resulting plant would probably be less vigorous. The deeper the level at which the bulb is situated, the greater the amount of energy that must be expended in order that the resulting shoot may reach the surface. By reducing the size of the bulbs developing in the deeper parts of the soil, surface cultivation at the right time would undoubtedly weaken, if it could not eradicate, the older plants in an infested area.

It has been stated that, in addition to the bulbils formed in the upper part of the soil, one or two are usually formed lower down. The primordia of these appear at a very early stage, and are visible as small white dots on the lower part of the stem when the germinating bulb is opened out. Their development, however, takes place rather slowly. The lengthening of the stem, which accompanies the contraction of the tuber, affects the part below these primordia more than the rest, and, as the tuber detaches itself from the old bulb scales and

*Explained in the legend to one of Ducellier's illustrations.

descends, carrying with it the young bulb and the fine thread-like extension of the stem, these bulbils often remain inside the empty shell of the old bulb, which retains its shape and remains fixed in the soil at the original level. As the bulbils grow they become imprisoned within the old bulb scales which form a kind of protective capsule inside which the bulbils complete their development. This explains why a number of the old bulbs, when opened, are found to contain two or three whitish bulbils joined together by a variable length of slender stem.

The rhizome or stem arises as a lateral branch of the orginal bulb axis, being formed in the axil of one of the bulb scales. In the event of injury to the rhizome, we should expect another to be formed in a corresponding position in the axil of another bulb scale. This has not actually been observed, but is doubtless true. But, in some tubers which had been kept in water in the laboratory for about 10 days, there appeared, just below the terminal main bulb, one or two smaller lateral bulbs, evidently from buds in the axils of the innermost scales (Fig. IV., 9).

VI. MEANS BY WHICH *OXALIS CERNUA* IS SPREAD.

As regards the natural spread of *Oxalis cernua*, the possibility of seed formation must be borne in mind, though it is stated to be rare in this country, and has certainly not been observed by the writer. But it is obviously impossible to be sure that it does not take place at all. Even the production of only one or two seeds by each plant in flower would mean a not inconsiderable quantity of seed formed in the case of an area densely infested with Soursobs. Seed produc-

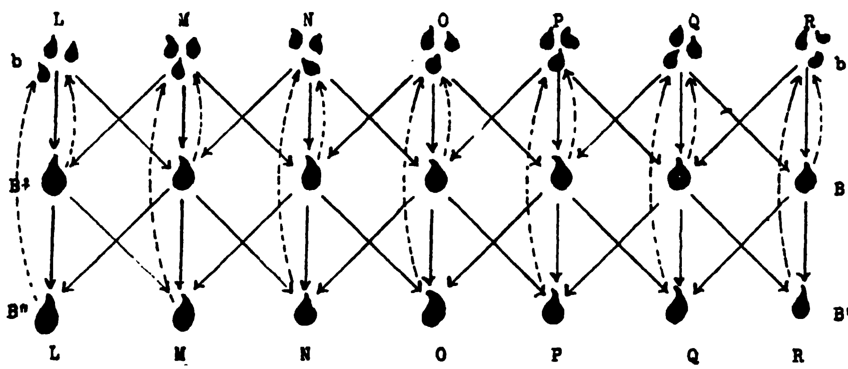


Figure 5.—Diagram to show method of local spread of Soursob due to the traction exerted on the bulbs by the contractile roots. The straight arrows represent directions of traction in the soil; the curved (and dotted) arrows indicate the formation of bulbils by plants produced on germination. (See text).

tion cannot, therefore, be ruled out as an unimportant factor in causing the spread of the plant, though we have no positive evidence of its occurrence. The seeds, when formed, are small and light, and are forcibly expelled from the capsules by the elastic separation of an outer fleshy layer (*aril*) of the seed coat.

The method of local spread due to the contraction of the tubers has been explained by Ducellier, and may be represented by the accompanying diagram (Fig. V.), which assumes, for purposes of simplicity, three directions of traction for each set of bulbils and bulbs, viz., vertically downwards and obliquely downwards, either to the right or to the left, as indicated by the arrows. The dotted lines represents the formation of bulbils by plants developed from the bulbs indicated in the diagram.

We may suppose a small group of bulbils to be situated near the surface of the soil (level b) just below the point O, that is, in the position Ob. The plants formed by these will reach the surface at O; but, when their tubers begin to contract, the new bulbs will be pulled downwards, either straight down, or

obliquely to the right or left, and so will come to occupy positions corresponding to OB′, PB′, or NB′, the plants formed from these on germination appearing at the surface at the points O, P, and N, respectively. These plants will produce bulbils below the surface at these points; but their developing bulbs will be drawn by the contraction of the tubers into positions corresponding to the positions MB″, NB″, OB″, PB″, and QB″, and so on, each set of bulbils formed near the surface being the starting point of a similar series of changes.

Another factor in bringing about a local spread of the plants is suggested by the dorsiventral habit of the stems of certain plants growing in the shade. The stem, in these cases, bends from the vertical to the horizontal, and any bulbils formed on the horizontal part will naturally be deposited some distance away from the original vertical axis of the rhizome (Fig. VI.).

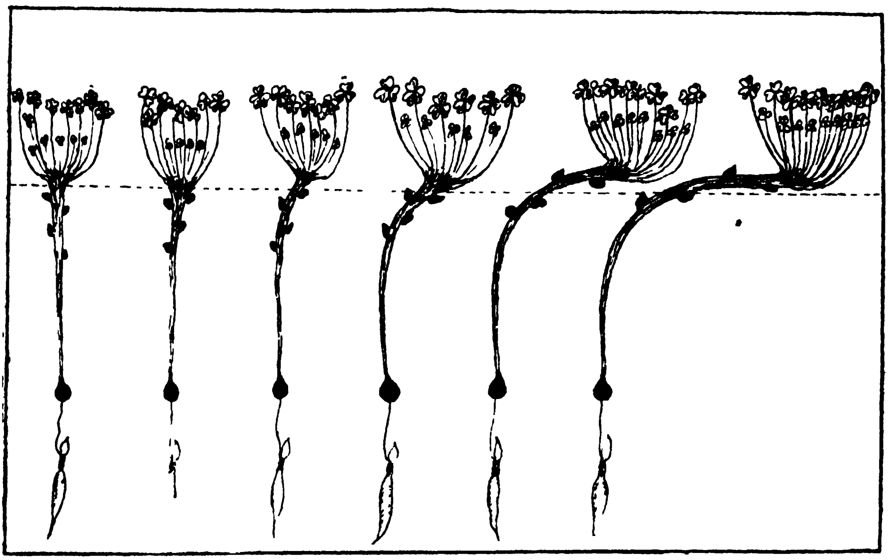


Figure 6.—Diagram to show method of local spread in the case of plants growing in the shade, and the assumption by the stem of a horizontal direction of growth.

By these methods there takes place a gradual increase in the size of isolated patches of Soursob in situations not subject to disturbance of the soil. There occurs also a steady increase in the number of individual plants within the area, and, by the descent of more and more of the bulbs into the deeper layers of the soil, a gradual consolidation of the ground occupied. But the spread in this way would take place rather slowly, were it not assisted by other factors tending to bring about a wider distribution of the bulbils, and their transport to new situations. Of these factors the first has been the intentional distribution of the bulbs as garden plants before the potentialities of Soursob as a weed were recognised, and the second was, doubtless, the unintentional spread of the plants locally, due to carelessness and to unsuccessful attempts at eradication. Probably the most important factor responsible for the subsequent spread of the plants throughout agricultural lands has been the use of farm implements in the ordinary processes of ploughing and cultivation, &c. Given a few patches of Soursob in a field, the bulbils formed by these are certain to be spread over a wider area during cultivation. An important point here is that the bulbils are abundantly present in the soil during the dry summer months, when the plants themselves are not in evidence, and can be spread much more effectively at this time than during the growing period of the plants. The appearance of plants in clean paddocks has doubtless been brought about in many ways, such as by the introduction of bulbils

with mud clinging to the farm implements, or to the feet of animals. Wind may play some part in the process, since the bulbils are very light, and are brought to the surface in large numbers during cultivation. The occurrence of plants along fences and other breakwinds suggests a possible role of wind in this connection. It is impossible to enumerate all the possible means by which the transport of bulbils has been effected; but it seems probable that much of the spread has been brought about unconsciously by the transport of bulbils in earth, &c., at a time when the plants were not visible above ground.

VII. THE CONTRACTILE ROOTS OF *OXALIS CERNUA*.

The tuber or contractile root is formed by the enlargement of one of the slender roots which arise from the base of the bulb or bulbil during its germination. The anatomical structure of the tuberous root does not differ essentially from that of other such roots, the main difference being in the relative proportions of the tissues present. The water-conducting tissue (*xylem*) is small in amount, whereas the region normally concerned in the translocation of food substance (*phloem*) is very large and, in fact, makes up the greater part of the substance of the tuber. Cross section of a tuber shows, when viewed under a microscope, a small centrally-placed xylem strand, consisting of a few primary vessels interspersed with parenchyma and surrounded by a number of secondary xylem groups separated by parenchymatous intervals, the whole forming a slender strand, which traverses the root in a longitudinal direction, and is distinctly visible to the naked eye through the translucent outer tissues of the tuber. Immediately outside the xylem is a layer of cambium which, however, does not appear as a regular layer in the expanded tuber. But it is to the repeated divisions of the cells of this layer that the tuberisation of the root is mainly due. On its outer side the cambium cuts off layer upon layer of thin-walled cells forming a wide phloem tissue, which is at first more or less uniformly composed of small cells with dense living contents. But as these phloem cells are pushed outwards by the subsequent divisions of the cambium cells they lose their uniform appearance. The parenchymatous elements of the phloem become greatly enlarged due to the absorption of water, while the other constituents of the phloem (*sieve tubes* and their *companion cells*) remain small, so that the phloem comes to consist of a wide parenchymatous tissue with scattered nests of sieve elements traversing it longitudinally and forming a branching network of slender strands, the meshes of the network being occupied by the parenchymatous elements. The tissue is covered externally by a number of layers of flattened cells forming the periderm or outer skin of the tuber. The periderm forms a tough membrane, and is relatively impermeable to water; it plays an important part in the subsequent contraction of the tuber.

The parenchymatous phloem constitutes the main contractile tissue of the root. In the fully expanded tuber it consists of cells all turgid with a watery sap, the outermost cells being firmly attached to the periderm, while the innermost ones are pressed against the cambium and xylem.

The mechanism of contraction is very simple, and, in *Oxails cernua,* appears to be identical with that described by Thoday in the case of *Oxalis incarnata.* As Thoday points out, the theory of root contraction most generally accepted, namely, that due to De Vries, in 1880, that it is caused by growth in thickness, the transverse expansion being accompanied by longitudinal shrinkage, is not applicable to the case of *Oxalis.* In *Oxalis incarnata,* and also in *O. cernua,* the contraction is brought about by shrinkage in all dimensions of the contracting part of the tuber, due to the removal of sap from the cells of the contractile tissue, the process being assisted by the drying of the soil The contraction takes place

progressively, commencing at the top of the tuber and extending downwards, the contracted portion becoming wrinkled and reduced in diameter. Longitudinal sections through the wrinkled part of the tuber show "an alternation of transverse plates of turgid cells with layers of collapsed cells which appear as crushed between the still turgid layers."

Ducellier likens the process of contraction to the pushing in of a concertina, or to the collapse of the bellows of a camera. The side walls of the bellows are strengthened by the method of folding along certain planes, in such a way that

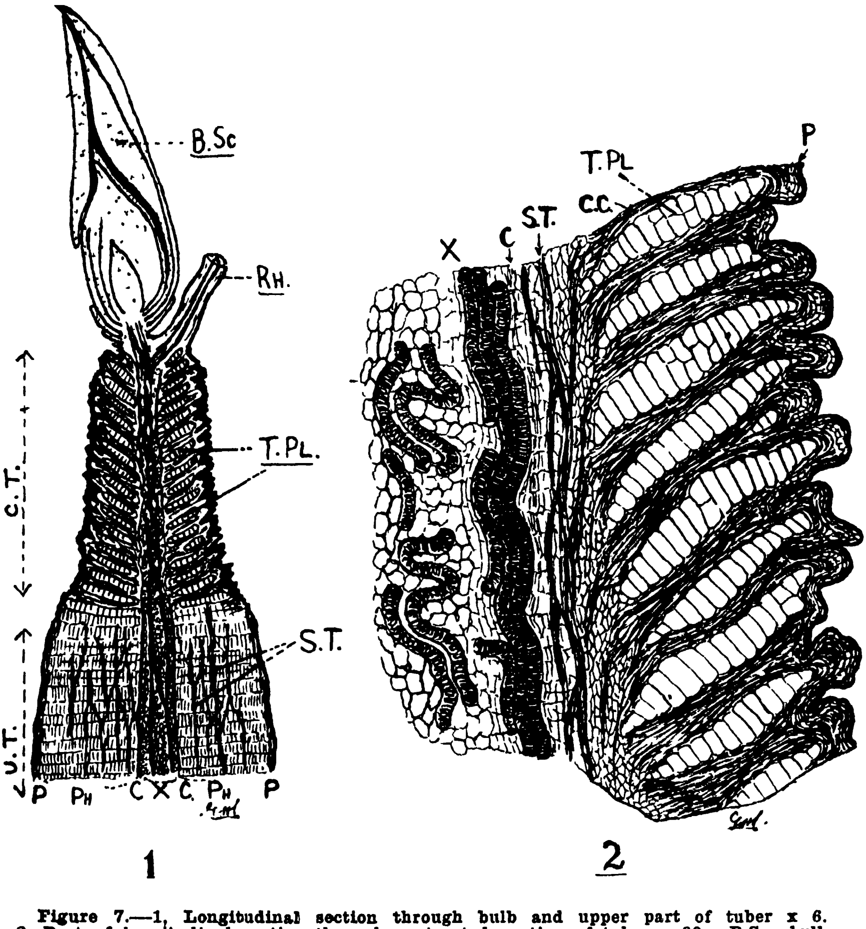


Figure 7.—1, Longitudinal section through bulb and upper part of tuber x 6. 2, Part of longitudinal section through contracted portion of tuber x 30. B.Sc, bulb scale. C., cambium. C.C, crushed cells. C.T., contracted portion of tuber. P., periderm. PH., phloem. RH., rhizome. S.T., sieve tubes. T.PL, plates of turgid cells. U.T., uncontracted portion of tuber. X., xylem.

the walls do not collapse inwards at these points; these planes behave as a series of rigid parallel frames, arranged at regular intervals and at right angles to the direction of contraction. During contraction these frames are approximated by the collapse of the intervening more flexible parts of the walls. Collapse of the bellows takes place when the two ends are pushed closer together; but if the apparatus is air-tight, it can also be effected by sucking air out of its interior, and so causing it to contract. This, in fact, is the type of mechanism responsible for the shortening of the tuber. In the fully expanded condition the parenchyma cells of the phloem are all filled with liquid; this sap is gradually withdrawn, by the

developing bulb and stem, from certain zones of cells which alternate in position with others which retain their sap. The collapse of the cells resulting from the loss of their sap causes the periderm or skin to be pulled inwards, so that the zones of still turgid cells are thereby approximated, like the rigid frames in the case of the bellows. In short, the contraction of the tuber is caused by the removal of the watery sap from phloem cells in certain transverse planes, and its retention by cells in planes which alternate with the first. The latter form plates of turgid cells, which are at first transverse, but subsequently become oblique due to "external friction resisting contraction more than the xylem resists compression."

Accompanying diminution in length there takes place a reduction in diameter of the contracted portion of the tuber; if the two ends of a fully contracted root are forcibly pulled apart, the periderm tissue becomes detached from the turgid plates of cells, and may be stretched to more than double the original length of the tuber.

VIII. THE ACID METABOLISM OF *OXALIS CERNUA*.

Oxalis cernua and the Succulent Habit.—We have already remarked that the habit of *Oxalis cernua* presents rather marked differences from that usually regarded as typical of succulent plants, namely, thick fleshy leaves or stems, heavily cutinised surface membranes, small internal air-space systems, high pentosan content, acid metabolism, &c. The impossibility of defining succulence, however, by any one single character makes it difficult to assign a position to *Oxalis* in this respect. The plant does show some tendencies in the direction of succulence; the stems are thick and soft, and, like the tubers, contain a large amount of water; the leaflets of plants grown in strong sunlight show a slight fleshiness, and their cuticular layers are thicker than in the case of plants growing in shade. If succulence is to be looked upon as a departure from the sclerophyll structure, it would be difficult to find a plant, outside of the fresh water Algæ and other aquatics, of which this departure is so marked a characteristic. The percentage of dry matter in the plants is surprisingly small, being usually less than 10, both in the tops and in the roots; thus, excepting the bulbs, the entire plant contains rather more than 90 per cent. of water.

Most succulent plants contain a certain amount of woody fibre and other sclerotic material, sometimes rather large amounts of it; indeed, some important fibre plants, *e.g.*, *Agave*, are of the succulent type. But in *Oxalis cernua* there is an almost complete absence of such tissue, the only woody elements present being the vessels of the xylem, which are concerned solely in water conduction, and even this tissue is small in amount. In view of the ability of the stems to push their way through hard ground, it is interesting to note that the plant seems to depend for its mechanical requirements, entirely upon the tugor of thin-walled parenchyma cells.

The marked difference in texture between the aerial parts of Oxalis and those of succulents, is to be explained, perhaps, by the bulb-forming habit of the former plant. By assuming a mode of life in which the aerial growth takes place during the wet season of the year, the dry period being passed as a dormant subterranean bulb, Oxalis has doubtless effected many structural economies that would be impossible in the case of a plant living above the ground during the dry summer months of the year. It is possible, therefore, that the habit of Oxalis represents an advance on that of the true succulents, in that the structural modifications normally associated with succulence have been rendered unnecessary by the adoption of a particular mode of life.

Diurnal Periodicity in Acid Formation.—The formation of large amounts of organic acid by Oxalis suggests a type of metabolism akin to that of succulent plants. The latter are usually rich in organic acids, the amounts of acid present in their leaves, however, being subject to variation at different times of the day.

In most cases the acidity rises during the evening and falls during the day, the process being accompanied by deviations from the normal unity value of the respiratory (CO_2/O_2) quotient, owing to the fact that part of the CO_2 formed in respiration is utilised in the synthesis of acid during the night. This diurnal periodicity is influenced by a number of factors: for instance, it has been shown that the amount of acid formed during the evening depends upon the illumination of the plants during the preceding day.

In view of the very dense growth made by Soursob, and its tendency to smother other herbage in a pasture, and so to form an unduly large proportion of the material consumed by grazing stock, it seemed to the writer to be of interest, and perhaps of importance, to ascertain whether the oxalic acid content of the plant were subject to a diurnal change comparable with that occurring in succulent plants. Since oxalic acid is poisonous, and occurs in Soursob in quantities sufficient to cause serious symptoms, and even mortalities, among stock at certain times of the year, it might be of value to know whether the plant is less poisonous at some times than at others, and, if so, the amount of variation in toxicity, and the times of minimal and maximal acid concentration.

To obtain information on some of these points, determinations were recently made, at Roseworthy College, of the total oxalate content of leaves gathered from plants at different times of the day. In some previous analyses, undertaken with a different purpose, Hickinbotham and Bennett found that approximately one-half of the total oxalates exist in the plant as free oxalic acid, the remainder in an insoluble form, probably as calcium oxalate. As these authors pointed out, the total oxalate content is of more importance, from the point of view of toxicity, than the amount of free acid present, since calcium oxalate may be decomposed during digestion with the liberation of free oxalic acid. For this reason the total oxalates were determined rather than the acid itself.

The analyses were performed by Mr. K. Woodroffe, R.D.A., under the direction of the writer's colleague, Mr. A. R. Hickinbotham, B.Sc. In all, two series of determinations were made, the one towards the latter end of June, 1934, the other two months later, during the final week of August last. In the first series the analyses were performed in triplicate, the figures given being the average results of the three samples of each set of leaves taken; in the second series they were done in duplicate, the results again being averaged:—

TABLE I.—*Total Oxalates in Soursob Leaves, June, 1934—In Intermittent Sunshine.*

1	2	3	4	5	6	7	8
Leaves Gathered.	Weight of Leaves Taken.	Total Dry Matter.	Total Oxalates.	Oxalate in Fresh Leaves.	Oxalate in Dry Matter.	Percentage Variation on Basis of Column 5.	Percentage Variation on Basis of Column 6.
	gm.	gm.	gm.	%	%	%	%
7 a.m. ...	25	2·0549	0·5875	2·35	28·60	—	—
5 p.m.....	25	2·3780	0·6025	2·41	25·30	+2·553	−11·54

The anlayses presented certain difficulties owing to the high water content of the plant and the extreme lightness of the foliage. Twenty-five grams, which was the amount taken in each case, represents a considerable volume of Soursob leaves, and a very large area of leaf surface. The presence of external moisture, such as dew, &c., in the early morning, adds very appreciably to the weight of the morning samples of leaves as compared with those gathered in the afternoon. This makes it difficult to weigh out equivalent amounts of the fresh leaves, and

introduces an experimental error, which was rather large in the first series of determinations undertaken. This is shown by the marked difference between the figures for the total dry matter in column 3, Table I. The increase in the total dry matter of the afternoon samples of leaves was probably due, almost entirely, to the greater amount of moisture adhering to the surfaces of the leaves gathered in the early morning. The same error accounts for the apparent increase in the oxalate content of the afternoon leaves (columns 4, 5, and 7). If the total oxalates are expressed, however, in terms of total dry matter, instead of the total weights of leaves taken, then the afternoon leaves show a slight decrease in acidity as compared with the morning ones (columns 6 and 8).

In the second series of determinations an attempt was made to obviate the experimental error in the first, by gathering the morning leaves at 9 a.m. instead of at 7 a.m. as previously. The dry matter of the afternoon samples was in this case slightly less than that of the morning leaves. If the percentage variation, either increase (+) or decrease (—), in the total oxalate content be expressed (1) in terms of the percentage of the total weight of leaves taken (column 5), and (2) on the basis of the percentage of dry matter (column 6), the resulting values are now in close agreement, whereas in the first determinations there was a marked discrepancy between them (columns 7 and 8, Tables I. and II.).

TABLE II.—*Total Oxalates in Sowrsob Leaves, August, 1934—In Continuous Sunshine.*

1	2	3	4	5	6	7	8
Leaves Gathered.	Weight of Leaves Taken.	Total Dry Matter.	Total Oxalates.	Oxalate in Fresh Leaves.	Oxalate in Dry Matter.	Percentage Variation on Basis of Column 5.	Percentage Variation on Basis of Column 6.
	gm.	gm.	gm.	%	%	%	%
9 a.m. ...	25	2·2140	0·5529	2·2116	24·97	—	—
4 p.m.....	25	2·1415	0·3555	1·4220	16·60	—35·70	—33·39
* 4 p.m. .	25	2·1681	0·4098	1·6382	18·90	—25·88	—24·31

* Analysed after being kept in a dark chamber continuously for 48 hours.

These determinations are necessarily of a preliminary nature, and were not intended to yield more than a rough indication as to the nature and extent of any daily change in acidity that might be present. Obviously the subject requires to be investigated on a more ambitious and comprehensive scale before any general statements can be made concerning the diurnal variation in the acid content of *Oxalis cernua.*

Nevertheless, the results seem to indicate quite clearly that a reduction in the total oxalate content of the plant does occur during the day, and that this reduction is greater with increase in the duration and intensity of illumination. The plants analysed in June showed a reduction in total oxalate content of approximately one-tenth of the amount originally present after exposure to intermittent sunshine and cloud during one of the shortest days of the year. In August, when the days were noticeably longer, the acidity at the end of a bright sunny day was less by about one-third of that present at the commencement of the day.

Another sample of leaves, gathered in the afternoon, was kept in continuous darkness for 48 hours and then analysed, the results being given at the bottom of Table II. The total oxalate, in this case, was less by about one-quarter than that of leaves collected in the morning. This is in accordance with what might be expected. In succulent acid-forming plants, it has been shown that the rise in acidity during the night is dependent upon the exposure of the plants to light

during the preceding day. In the absence of such previous illumination, acid formation is interfered with, and this probably accounts for the results obtained in the case of *Oxalis cernua*.

It would seem, therefore, that there is, in *Oxalis cernua*, a type of acid metabolism similar to that which occurs in many desert succulent plants, and of which a diurnal periodicity is a well-marked feature.

The above observations suggest that Soursob is less poisonous by day than during the night, and it is conceivable that some practical use might be made of this. Any factors which tend to reduce the concentration of oxalic acid in the plants would naturally increase the margin of safety for stock grazing on Soursob pastures. It is at least possible that sheep, which have been rendered more susceptible to oxalic acid poisoning by a lowering of the calcium reserves of the body, as is often the case with ewes in lamb, might feed during the day with comparative safety on a Soursob pasture that would be dangerous at night. The fact that cases of Soursob poisoning are much more frequent in the early morning than at nightfall does at first sight suggest this view. On the other hand most Soursob fatalities occur during the early winter months, when the acid variation would not, presumably, be great, owing to dull weather and to the relative shortness of the days. Again, the greater amount of moisture in the herbage, the low temperatures, and heavy feeding during the night, favour the development of bloat and other troubles of a digestive nature, so that it seems doubtful whether the greater incidence of Soursob injury during the night is to be attributed to an increased oxalic acid content of the plants at that time, though it is possible that this may play some contributory part. The effect of an increased acidity would certainly be in the direction of reducing the margin of safety; and so, until we have more definite knowledge of the subject, it would do no harm, and might possibly do good, to keep stock off the Soursob during the night, in cases where this is conveniently possible.

IX. THE PROBLEM OF CONTROL AND ERADICATION.

Apart from the toxic effects due to the contained oxalic acid, Soursob owes its reputation as a weed to a number of circumstances, such as its wide distribution throughout the State, the great density of its infestations, the vigour of its growth and marked regenerative power when injured, and the efficiency of its method of propagation by means of bulbils.

Obviously we cannot expect to rid the State of so firmly established a weed as the Soursob by means of any simple magic formula. But it is possible to eradicate it from small holdings, and, in the case of the larger areas of agricultural land, much can be done to obviate the harmful effects of its growth. Fortunately there are certain peculiarities of the plant which make it less formidable as a weed than some others, such as Cape Tulip or Hoary Cress, which, though quite common enough, are not nearly as abundant as Soursob. Some of these peculiarities offer a means whereby the plants can, in certain circumstances, be eradicated or controlled.

In the first place, the thin texture of the foliage, and the general weakness of the aerial parts means that the plants can be attacked with chemical sprays of such dilution as would be quite ineffective in the case of weeds of coarser texture. A 2½ per cent. solution of sodium chlorate, which is about one-quarter of the strength required for Cape Tulip, will destroy Soursob plants, and can be used to control the weed in suburban gardens and other small areas. The weak solution does not kill the tougher grasses, &c., and the residual effect of the poison on the ground is almost negligible.

Owing to the cost, it is not practicable to use chemical sprays on large areas of agricultural land, but control can often be effected here by making use of another feature of the plant, namely, the limitation of its period of vegetative

growth to the winter and spring months of the year, and its dependence upon moisture. From the farmer's point of view the main difficulty with Soursob is its tendency to smother other plants, especially cereal crops during the early stages of their growth. This difficulty, however, is usually associated with mid-season sowing of crops, in which the early seedling growth is made to coincide in time with the most vigorous growth of Soursobs. By sowing early with a vigorous variety of wheat, or by the late sowing, after repeated cultivations, of an early-maturing variety, the trouble can, in large measure, be avoided. Such has been the experience at Roseworthy Agricultural College. The following account, which is taken from a joint report of College activities recently published in this *Journal* (July, 1934) by the Principal (Dr. A. R. Callaghan) and the Farm Superintendent (Mr. O. Bowden), well illustrates the principles involved:—

"Following 70 points of rain in mid-April, the sowing of the field 'Crouchs C' with the variety Ford was begun. The greater portion of this field was known to be badly infested with Soursobs. . . . . Germination was very rapid and satisfactory, the wheat grew rapidly, and at the outset gained a lead on the Soursobs. This ascendancy was maintained throughout, and in spite of the blanket of Soursobs which formed a dense undergrowth on the field, the wheat competed so successfully that the Soursobs, except for a few stray individuals, never flowered, and the wheat crop came through triumphantly, with a yield of 26bush. per acre off 56 acres, and nearly 3 tons of hay over the remainder.

"It is interesting . . . . to compare the treatments and results from two other fields where Soursobs were prevalent. 'Days C' was sown late, finishing on June 10th, to Waratah. Additional to the treatment given to 'Crouchs C' this field was cultivated, spring-tyned, and again cultivated, with the gratifying result that the Soursobs were absolutely subdued, and after the wheat had brairded only a few weak Soursobs were evident in the field, and their effect upon the resultant crop was negligible. From this field a yield of 26½bush. per acre was harvested off about 80 acres. Another paddock, 'Dalys C,' received intermediate treatment to those already cited, and was sown mid-season. This paddock was worked in April, at the same time as 'Crouchs C' was being sown, but was subsequently cultivated and spring-tyned just prior to seeding on May 17th to Ford wheat. Here both Soursobs and wheat came away simultaneously, and with weather conditions more conducive to Soursob growth than to wheat growth, the balance of competition was for some time largely in favour of the Soursobs. The crop was thinned out considerably, the yield as a result was considerably lower, at 20½bush. per acre, than those obtained as a result of the paddock treatments previously described."

From these results, and for the reasons given when discussing the morphology and vegetative life cycle of the plant, it seems that cultivation may do much towards controlling and possibly towards eradicating, Soursob, provided that it is undertaken at the right time. Theoretical considerations suggest that the most vulnerable stage in the life history of the plant is that at which the tubers have reached their maximum size, but before they have begun to contract; that is, when the energies of the parent bulb have been fully expended, but before the new bulb has begun to enlarge, and before the bulbils have reached an appreciable size. This stage probably occurs late in June, but doubtless depends largely upon the rainfall; in any case, more detailed information on this point is needed. Cultivation earlier than this would be followed by rapid regeneration of the plants, while later cultivation might mean the formation of some bulbils, and the withdrawal of certain bulb rudiments below reach of the farming implements.

Another method of control that has been suggested is to turn pigs or turkeys on to areas badly infested with Soursob, and, used in conjunction with cultivation, this would doubtless be a very effective means of control. The tubers are stated to be greatly relished by swine, which display great energy in rooting them out, and both the bulbs and the tubers have a considerable nutritive value. If a badly infested area is ploughed when the tubers are well developed, and if pigs are then turned on to the ploughed ground, it is probable that the area will be effectively cleaned of Soursob. The method is said to have been used with success at Gawler River and some other parts.

X. ACKNOWLEDGMENTS.

The writer is pleased to acknowledge his indebtedness to the following gentlemen for assistance in various ways in the course of the preparation of this paper:—

(1) The Librarian and assistant Staff of the Public Library, Adelaide, for much courtesy and help, and particularly for obtaining, on loan from the Public Library, Melbourne, Volume XXV. of the *Revue Général de Botanque* containing Ducellier's paper on *Oxalis cernua.*

(2) The Librarian, Public Library, Melbourne, for the loan of the work referred to.

(3) Mr. H. C. Trumble, M.Ag.Sc., Agronomist at the Waite Agricultural Research Institute, for permission to make use of some unpublished notes of his on the early history of *Oxalis cernua* in South Australia, and also for information concerning the control of Soursob by means of chemical sprays.

(4) His colleagues, Messrs. A. R. Hickinbotham, B.Sc., Dip.Ed., Chemist, and K. Woodroffe, R.D.A., Cadet in Chemistry, for the oxalate determinations described in the text.

XI. REFERENCES.

1. CALLAGHAN, A. R., and BOWDEN, O.—"Report on Activities at Roseworthy College," *Journal of Agriculture, S. Aust.*, XXXVII., 12, 1934.
2. DUCELLIER, M. L.—"Note sur la Végétation de l'Oxalis cernua, Thunb. en Algérie," *Rev. Gen. de Bot.*, XXV., 2, 1914.
3. EVANS, H.—"The Physiology of Succulent Plants," *Biological Reviews*, VII., 3, 1932.
4. HICKINBOTHAM, A. R., and BENNETT, W. G., "Soursob Troubles," *Journal of Agriculture, S. Aust.*, XXXIV., 12, 1931.
5. KNUTH, A.—Monograph on Oxalidaceae in Engler's *Das Pflanzenreich*, 95, 1930.
6. THODAY, D.—"The Contractile Roots of Oxalis incarnata," *Annals of Botany*, 40, 1926.

SEED WHEAT FROM CROP COMPETITIONS.

In Wheat Competitions conducted in the undermentioned Districts the following Competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

Central.—A. H. Wolf, Rosedale—Pine Head
L. W. George, Wasleys—Sword
Matters and McCabe, Wasleys—Sword
W. K. Oliver, Wasleys—Sword
N. J. Griffiths, Salisbury—Ben Cubbin, Ghurka, Dundee
Dawkins and Aunger, Gawler, Sword
Kerr and Cliff, Waratah—Waratah
W. F. Leak, Willaston—Pine Vale, Quality, Nabawa

Jervois—W. Jericho, Cleve—Waratah
J. Brus and Sons, Mangalo—Sword.
L. H. and D. H. Hogg, Darke's Peak—Nabawa, Waratah, Sword
M. H. Burton, Rudall—Waratah
F. I. Kestel, Rudall—Bencubbin
D. C. McCallum, Rudall—Waratah

Buxton—H. Cant, Kimba—Sword

Oats.

Mr. W. C. Johnston advises that he inspected a crop of New Zealand Cape Oats on the farm of Mr. F. H. Wolf, of Rosedale, which he reports as being suitable for seed.

PAPERS READ AT CONFERENCES.

CONFERENCE OF EYRE'S PENINSULA BRANCHES.
KYANCUTTA, September 9th.

RABBIT DESTRUCTION.

[L. H. DANIEL, Kyancutta.]

The presence of rabbits on his holding represents a loss to the farmer each year. The revenue, which is sometimes earned by the sale of skins and carcasses is more than offset by the amount of feed and crop they eat, the considerable time spent in keeping them in check, and the number of sheep they displace. Four or five rabbits can, on occasion, check the growth of an acre of crop. It is obvious, therefore, that rabbit destruction is a problem which must be attended to by every landholder whose land and adjoining roads are infested with the pest.

Unfortunately under present farming conditions, it is often impossible for a farmer to employ sufficient labour so that he can deal with the pest effectively. However, the following is the experience of the writer gained over a number of years:—

After harvest, when the rabbits are most numerous, every vestige of stubble and grass consistent with necessary feed should be burnt, and the poison cart should be used. Because of the rabbit's keen sense of smell the poison should not be touched by hand. Some oil of aniseed should always be added to the poison to make the smell of it attractive. The addition of sugar to the poison will also prove an inducement to them. Some success can also be obtained by ploughing in the warrens with a strong, single-furrow plough in the summer. The mouldboard should be removed to allow the plough to go to its maximum depth. Immediately after seeding, the extermination should be continued in earnest, for it is then they are breeding. Trapping is very effective if they have not assumed plague proportions. Spring traps are the best if only a few are about. Paper should not be used to set the traps, as it interferes with the action of the jaws and forms a pocket from which the rabbit's leg is easily pulled. Netting traps deal with rabbits more quickly if they are numerous. In either case, at least 40 traps are required. The netting traps should be constructed of 1in. mesh netting to prevent the escape of young rabbits. These traps require at least one bag wrapped right around them, two if necessary, and holes in which traps are not placed must be covered by bags and dirt put on the bags. It is usually a waste of time filling in the holes without this precaution.

FUMIGATION.

The hand-fumigators on the market are very effective for small to medium warrens, but plenty of fire and sulphur must be used. Another method that I have used is to mix a tin of phosphorous poison in four gallons of warm water, and pour this into a tin which can be corked up. A small quantity of this poured down each burrow as far as one can reach will create a gas which will kill the rabbits once the holes are filled in. The exhaust gases from a motor vehicle can also be utilised for fumigating by connecting the exhaust pipe to a burrow by means of a flexible metallic pipe. The engine should be speeded up to one-third throttle and the holes filled in as the gas appears. There is no need to add oil to the petrol. The gas will be quite visible and actually carbon-monoxide which is the destroying agent present in the gas, is invisible. The engine should be run for some minutes after all the holes are filled in. The engine oil must be changed at so many working hours in this case, and not at a certain mileage. About 2galls. of petrol will be used daily.

The system which the writer considers the best, consistent with time and expense, is to use a portable fumigator having three units, *i.e.*, engine, powerful blower, and a fire-proof furnace. Stumps are burnt in the furnace and plenty of sulphur is

thrown in at each warren. A large diameter flexible metallic pipe is needed to connect the furnace with the warren. This type of fumigator will force the gas to the rabbits no matter how deep they go, and a large area of country can be covered in a short time. Sulphur is obtainable at approximately 15s. per cwt. and 1 to 2cwts. per year will usually suffice even in extreme cases. After the burrows are fumigated they should be destroyed by ploughing in. This should be done before "outside" rabbits have had time to re-open the burrows.

Prevention is better than cure, and every farmer who can, should ring-net his farm. This will help to keep the pest in check, though it must not be thought that he is going to keep "the other man's rabbits" out entirely, even if they do not burrow under the netting, because the writer has seen young rabbits get through 1½in. mesh netting without much effort. It is hoped that in the near future the Government will pay more attention to the destruction of rabbits on railway property, particularly where the water mains follow the railway.

SIDELINES ON THE FARM.

[E. K. DYKE, Kyancutta.]

Since starting to write this paper things have altered quite considerably; there has been a considerable rise in the price of wheat, and there seems to be a tendency for wool prices to recede. In spite of this there are very few who will not agree that sheep are a necessity on the farm, not only on account of the wool and mutton they produce, but also because of the aid they are in keeping weeds down on the fallow.

There is another item to be considered, and that is the disposal of surplus sheep or lambs. In some years it is possible to have suitable lambs for export, but unless something can be done in the way of fodder conservation to help the lambing ewes in a season like the present, there seems little hope of making them a regular sideline. It is fairly easy to carry the rest of the flock over a bad spell if oats are grown and the grain stored, but this is hardly sufficient for forcing lambs along. It might be a good plan to make ensilage from part of the oat crop or from barley in the good years, and so have suitable feed for ewes in the drier seasons.

The ensilage could be stacked or put in one of the various forms of silo. On those farms that have the usual sandhills perhaps the best idea would be to scoop a deep trench through the top of one and fill that with ensilage.

Oats have proved quite a payable crop during the last year especially; they were readily saleable at about 4s. a bag for feed. Also, those who grew them had a very valuable feed reserve. Barley is not grown to any extent here, but if unable to grow a good enough sample for the maltsters it might be payable to feed it to pigs, especially if crushed.

Most farms keep a few pigs, and with a bacon factory at Port Lincoln it should be possible to make a little money from them. Several farmers in the district have procured the right type of pig, and seem pleased with the return from them. The best plan is to have small paddocks for them to run in, and sow these, if possible, in the winter with some quick-growing greenstuff. Almost anything in the way of greenstuff from the garden is readily consumed by pigs. They are very fond of pie-melons which are easily grown on fallow.

Cows can be quite an asset on the farm if properly cared for, but unless this is done they are more likely to become a liability. Ensilage is particularly valuable in keeping up milk production in the dry months of the year. A friend of mine who made ensilage last year, mostly from King Island Melilot, informed me that his cows kept up their production well during the summer with that fodder.

[*Papers Read at Conferences.*]

Fowls are a stand-by on most farms at some seasons of the year, and if more care were taken in the hatching of chickens at the right time results would be much better. Black Orpingtons seem to do very well on the farm, and from the results at the Parafield Competitions seemed to lay a greater proportion of their eggs during the cold months of the year than most other breeds. This is quite an advantage, as those are the months when eggs bring the highest price.

A small garden is another activity which should receive some consideration from those who have water laid on. A few fruit trees and vines can be kept going easily if some of the summer garden is planted between them. The water used on these plants will keep the trees going well. Several farms grow all their own vegetables, except perhaps potatoes. Onions do very well about here.

FALLOWING AND ITS SUBSEQUENT WORKING, IF ANY.

[J. DYKE, Kyancutta.]

Fallowing is necessary if only as an aid to better and cheaper production of wheat; an acre of good fallow is worth two acres of stubble ground, especially in seasons like the present. Also, the saving in seed and super is a consideration in the cutting down of costs of production. Fallowing should be commenced as soon after seeding as possible; in fact, immediately after if the plough or whatever implement to be used is in order. There are, of course, several methods which may be followed, and all have their good points, according to the class of soil to be worked and the district where situated. Where the soil is to be worked is of a sandy nature, the stump-jump tine cultivator gives good results, and enables the work to be done quickly. For classes of soil that pack solid with the traffic of stock feeding over them the plough is preferable to the cultivator, for the latter is apt to get strained if a lot of draught has to be used. Regarding depth of ploughing, 2in. is deep enough on the average, but that again depends upon the class of soil. After the plough is finished the harrows should be used, preferably across the ploughing, which will break it down, pack the subsurface, drag out any loose stumps the plough may have partly buried, and help to kill more of the small weeds which will have germinated. After this has been done the fallow can be left for a while until the weeds show up, when sheep should be turned on to deal with them and to help pack down the soil.

Any further cultivation needed could be done with harrows to which share points have been attached; these will cut all the weeds, only cultivate to a shallow depth, and not fetch up a fresh supply of weed seeds to germinate, which the cultivator is likely to do.

HARROWS.

[O. J. MURPHY, Warramboo.]

"Harrow" is a very old word. It occurs in the Old Testament. As a noun it referred probably to a threshing machine. The verb rendered "to harrow" occurs also in the Old Testament, and expresses apparently the breaking of clods, though it is doubtful whether this was done by any machine such as we call a harrow. Nevertheless, the harrow is one of the oldest of agricultural machines. Many types and designs have been devised to meet varying needs, and to-day no farm equipment in South Australia is complete without a set of harrows.

Primarily the harrow was used to break down clods, and on the heavier soils of this State harrows are still used for that purpose. A common practice is to use harrows immediately after the plough during fallowing operations, particularly on heavy clay soils to break down clods, scatter the weeds, and to provide a smoother surface for subsequent tillage by the cultivator.

[*Papers Read at Conferences.*]

The two main types of harrows which concern wheatgrowers are the set or plain land harrows, and the stump-jump harrows for used on stumpy or stony ground. Each kind of harrow is obtainable with plain spikes or with share points. The latter type are usually referred to as "scarifier" harrows.

Harrows are used not only to break down heavy soils, but also to destroy weeds in the early stages of growth, and considerable importance is attached to the arrangement of the teeth or spikes of the harrow in order that each spike may do the maximum amount of work so far as the destruction of weed growth is concerned.

Another important feature of the harrow is its effectiveness in the production of a good seedbed—a fine, shallow mulch over a well-compacted under layer. The use of harrows in this direction is especially valuable during the period between harvest and seeding time.

In regard to the use of harrows in this district—where considerable areas of the soil are of a sandy nature liable to drift—it may be said that harrows are not necessary to break down the soil. Their use is confined more to the destruction of weeds and to the production of a shallow seedbed. It is sometimes contended that the use of harrows causes drift, and this contention has caused an aversion from the more general use of the harrow.

The opinion of the writer formed during a period of five years in this district is that the harrow used intelligently is a very effective machine. It is a comparatively cheap implement, easy and inexpensive to keep in good order. Over 90 per cent. of our fallowing and seeding operations during the past five seasons have been done with a rigid-tine cultivator, a disc drill, and a set of harrows. We have used a combine also, but have found the disc drill and harrows equally effective, less expensive, and quicker than the combine. Although we have not used harrows extensively on fallowed land prior to harvest time, we have found during the past two seasons, when there was an abundant growth of grass, that the use of harrows immediately after the first fallowing operation by the cultivator enabled us to make a much better job of the subsequent cultivation of the fallow in the spring time.

In regard to drift, our experience is that summer rains—particularly heavy showers during thunderstorms which have a smoothing action on fallowed ground—are the chief cause of drift. Harrows used after such rains, rather than cause drift, have a very marked effect in checking the shifting of the soil. It is suggested that harrows be used freely after rain in the late summer and autumn. In addition to checking any tendency of the soil to drift the growth of weeds is checked, and the soil is left in excellent condition for sowing with the ordinary disc drill if so desired.

It is more than probable that the intelligent use of harrows in autumn will give better crop results than allowing the fallowed land to remain untouched until seeding, and then attempting to sow the land and destroy weeds with one stroke of a combine.

During the past two seasons a patent share which can be clamped to the spikes of the ordinary harrow has been on the market. Harrows with these shares attached are practically converted to scarifier harrows, and are very effective in the destruction of weeds in their early stages of growth. The ridges in the soil left by these harrows are obviously more pronounced than the "track" of the ordinary harrow, and therefore more effective as a check on drift.

The writer contends that harrows in conjunction with the disc drill form a better combination for seeding purposes in this district than the combine, particularly on the newly-farmer areas, where the presence of stumps is bound to cause the breaking or straining of the tines of the latter machine, loss of time due to stumps lodging between the tines, and expensive repairs, which result in an unsatisfactory job.

[*Papers Read at Conferences.*]

HORSE BREEDING.

[M. F. O'Brien, Kyancutta.]

At the present time well-bred horses are bringing good prices, due, no doubt, to the curtailment of breeding a few years ago when tractors were taking the place of horses on so many farms. A large number of farmers who were previously using tractors have now turned their attention to breeding horses, as breeding is the most economical way of obtaining a really good team. Most farmers are breeding one or two foals each year to replace aged horses on their farms, while others are breeding more than they require, and these surplus horses will be placed on the market during the next few years, with the result that prices will not be maintained at their present level. It will therefore be necessary for those who are breeding horses for sale to pay special attention to the type of horse that they are breeding. A good type of farm horse will always command a fair price, while inferior and medium types will be hard to dispose of.

After selecting the best mares on the farm, be very careful in the choice of a sire. Do not breed from a horse not true to type. Many farmers breed from any sort of a colt because they can turn him in the paddock with the mares and save the trouble of looking after an entire. This method is false economy, for it costs no more to rear a good type of foal than a half-breed. It may be said that the half-breed will work as well as a good horse, but he will never look as well in the team, and it should be every farmer's desire to have as good a team as possible. Again, the medium horse will never command near the price that a good type horse will in the sale ring.

The farmer who does not keep an entire, and who patronises a travelling horse should, if he has a choice, look well into the merits of each horse travelling in his district. If you have thick-set, nuggety mare always choose a good, tall horse, and *vice versa,* but remember he must be true to type, and a proved foal-getter. I prefer the Clydesdale type of horse for farm work. They usually prove to be good workers, combining strength with pace, and are exceptionally good tempered while the mares are always good mothers.

Care of the Foal.

When the foal is born catch it and paint the navel with iodine, repeating the treatment daily for three or four days or until the navel has dried up; this will often prevent navel ill. Also, see that the mare is normal and has plenty of milk. Give her a hot bran mash after foaling, continue to give liberal quantities of bran and crushed oats if she does not appear to have sufficient milk for the foal, and allow her to graze at will in a small paddock of greenfeed. Should the foal refuse or be unable to suckle it may be necessary to give an enema, but before doing so try working a little olive oil into the anus with a finger. This often gives relief to the foal and saves straining.

To wean a foal I prefer a small paddock of greenfeed. A small quantity of chaff and oats may be made available, the foal having free access to plenty of clean water. The mare must not be forgotten, and the day the foal is weaned the mother should be fed on chaff (no oats) containing 1lb. of Epsom salts, and be given only small quantities of water for a day or two. It is best to keep the mare working as this will help to dry her off. Should the udder become swollen and hard rub first with olive oil, then with vinegar (three parts) and olive oil (one part), and if not working give plenty of exercise. Breed foals early, say, in July or August. At this time of the year there is usually plenty of greenfeed for the mares, and the foals when older will shed their coats earlier, and usually look better than a late foal. To breed early foals and wean them at, say, six months it is essential that a small paddock of lucerne be available.

[*Papers Read at Conferences.*]

Colt foals should be castrated in spring at about 14 months. It is best to obtain the services of a veterinary surgeon, if one is available, but the operation may be successfully performed by any competent stockman. The three main points to remember are:—First, see that the emasculators have been sterilised; second, rope the colt securely and throw him on a patch of green grass—not in the stable or yard where there is any sign of stable manure; and third, use plenty of disinfectant.

The colt or filly can be broken in at two years by giving it a few short yokes in the cultivator or harrows when working back the fallow. This should harden the shoulders, and if worked during the harvest they will not be so likely to scald. Do not work a two-year-old more than four or five hours a day in a stripper or harvester if the weather is very hot.

It is advisable to put them in a waggon when wheat carting to teach them to pull, but do not overload, and do not expect a horse to do a full day's work or pull his full share of a load until he is at least three years old. If you treat a horse well while it is young you will be amply repaid by the extra service it will give when it is older.

TREES FOR SHADE OR SHELTER.

[Frank Chilman, Warramboo.]

Of all the various form of gardening activity, the growing of shade and ornamental trees and shrubs gives the most lasting pleasure and benefit, and in the long run gives the best returns for the amount of labour and expense involved.

In a district such as ours there are not many beautiful native trees, and very few homes can be built among handsome natural trees, so that it becomes necessary to grow trees for shade and shelter as well as to beautify our holdings. The various kinds of gums seem to be the best suited for this district, particularly the Sugar and Tooart, both being very hardy and quick growing, and can easily be raised from seed. The only expense is the 6d. for seeds, one packet being enough for several years. Ants seem very partial to these seeds, and it is just as well to try and protect them from these pests until the plants are well above ground.

Pepper trees, too, are a good standby, doing particularly well in sandy soil, and making a wonderful shade and shelter. They are easily raised from seed, but need transplanting very young if sown in a tin together. The Tagasaste or Tree Lucerne is a nice, ornamental, flowering tree, grows quickly with a nice graceful foliage, and has a mass of flowers in the spring. It makes a good break of shelter.

The various pines such as Insignis and Aleppo make nice trees, but are very slow growing. I have not been successful with pines of any description. Sometimes the native pines can be dug up when small and transplanted around homesteads, and eventually grow into nice trees. There are a number of other trees such as the Kurrajong, Tamarisk, Moreton Bay Fig, &c. It must be remembered when planting trees of any description that they are robbers of soil, and you cannot expect to grow anything else close to them; pick the place and plant them for shade and shelter as well as to beautify the homestead.

PAST AND PRESENT-DAY FARMING ON THE WEST COAST OF SOUTH AUSTRALIA.

[A. E. PLACE, Palabie.]

The methods adopted by farmers prior to the introduction of drills and fertilisers were, after getting the scrub down—which had to be cut with an axe—to plough the soil, always broadcasting the seed; some farmers sowing before ploughing, others after ploughing, then using the harrows to cover the seed. As much as 15bush. to the acre have been reaped from ground cultivated in this manner. When superphosphate and the drill appeared on the scene they caused a great diversity of opinion, many farmers declaring the soils in these parts heavy enough for wheatgrowing without super, some declaring that with the limited rainfall the super would cause the crops to blight or burn off during September and October, which months were very frequently dry. Many of the farmers around Murat and Denial Bays had migrated from Yorke Peninsula prior to the advent of super, and on reading of results obtained from land on which they had been practically starved decided to use the fertiliser from which a very marked yield was obtained, and within two years every farmer was using super. These farmers always used the plough on new ground, and in many instances gave the ground a light ploughing the second and third years, cultivators at that time not being up to the standard of the present day.

During the period from 1927 to the present time farmers on this part of the Peninsula—from Poochera down the line and north to Cootra, and in this and adjoining districts—seem to cling to the idea of just drilling in new ground, sometimes even to the second and third year This method instead of giving maximum results invariably produces the opposite. In giving preference to the plough I do so with the contention that it gives a more uniform seedbed, which is a big factor in producing wheat; also it breaks more roots, thus considerably retarding the growth of shoots, this being very beneficial to the crop. By the surface roots being broken the crop receives more moisture when coming to maturity.

By putting the work into new ground more successful results will be obtained, and farmers, instead of looking for a cheap crop the first year, have a much better and more reasonable chance of getting that result the second year, as they have less shoots to contend with, and with better cultivation get a more prolific growth, thus ensuring a better burn of stubble, which will again bring the mallee menace to a minimum. There is no doubt live stumps are a menace to production, and the sooner this menace is eradicated the sooner is a profit instead of continual loss going to be the lot of the farmer.

[*Papers Read at Conferences.*]

PINNAROO LINE CONFERENCE, September 18th, 1934.

A FEW AILMENTS COMMON TO SHEEP IN THE MALLEE.

[R. A. JENKINS, Lameroo.]

Pink-eye.—Symptoms—Running at the eyes and staggering walk owing to partial blindness. Isolate as soon as noticed. I have always found boracic powder an effective treatment. Carry the powder in a bottle in the waistcoat pocket, also a few sheets of writing paper if there are many patients. Make a tube about ¼in. in diameter, and blow a little powder into the eyes while holding the lids open with the fingers.

Scabby Mouth.—Cases of this trouble have been brought into the district, especially from the Lakes district and Lower South-East. Isolate and swab with a 1 per cent. solution of bluestone. Keep in a paddock of long feed if possible.

Foot-rot has been noticed at Lameroo in wet seasons. The hoofs should be kept trimmed at all times in sandy and soft country.

Nasal-bot is very prevalent in this district. If a sheep's nose is running profusely and it is continually blowing its nose, it is usually an indication of nasal-bot. Sit the sheep up and run a weak solution of kerosene and soap suds into the nostril. This will make the bot release its hold, and the sheep will blow it out, and it can be destroyed.

Bottle Jaw.—This complaint has been observed in the Mallee. It is a distinct swelling under and between the bottom jaws. If inspecting a flock of sheep with the idea of purchasing, and this characteristic is observed, do not confound it with dew-lap. Do not buy them; it is a sign that they have come off unhealthy country, and are no doubt infested with worms and liver fluke. On examination of the eyes and skin a general anaemic condition will be noticed. If this trouble develops in a flock starve for at least 12 hours, and give one Cooper's tablet to two-tooths and two tablets to grown sheep. Repeat the dose in a fortnight. Always keep a lick of one part super to three parts coarse salt available for the sheep.

Infectious Toxaemia.—This disease is widespread in the Mallee and in other parts of the State. Most farmers are acquainted with the symptoms—staggering gait, weakness, and knuckling over at the knees. Any aged sheep appear to take the complaint, and from observation it seems to be no respecter of sex. Death nearly always follows an attack, which usually lasts only a short time. A *post mortem* shows the paunch and small intestines to be full of gas, and an abnormal quantity of fluid in the heart sac, lung cavities, &c. The kidneys and fat have a watery appearance. Undoubtedly this complaint has caused the death of thousands of sheep in the Mallee, a great many of which could have been saved with the use of a little more discretion and observation. Read the bulletins published by the Council for Scientific and Industrial Research.

Entero-toxaemia.—This disease is caused by a germ which remains in the soil for an indefinite term, and asserts itself under favourable conditions. It has been found that flocks depastured on germ-infested land for a number of years become almost immune, which fact tends to signify that it is advisable to keep up flock strength by breeding rather than by purchase. Methods of Control—A vaccine has been formulated to inoculate against the disease, but is not available commercially. The trouble comes in nearly all cases in sheep which are doing well and running in luxuriant feed. This would signify a possible lack of roughage which all ruminants require, and also lack of exercise. Therefore, move the sheep into a paddock where they have to work a little harder for their food. It is essential—if it is desired to keep this disease in check—to completely incinerate all carcasses of sheep and other animals on the property. In any case this should be done to check blowflies.

[Papers Read at Conferences.]

Pulpy Kidney in *Lam*[illegible] itself in sucking lambs of all ages, especially in the mutton breeds running on rich clover pasture. Treatment, unfortunately, tends to defeat the object of the lamb raiser, because should the trouble become too prevalent it is essential to remove the flock on to rough pasture if one does not wish to lose a large percentage of lambs. I have successfully treated a number of apparent cases of this complaint by drenching with turpentine, 10 to 15 drops, and 2 dessertspoons of raw linseed oil well shaken. A sheep is easy to drench if a small olive oil bottle is used. Do not hold the head too high. Farmers should make more *post mortems* of their animals, as by doing so and making observations they will notice many conditions which should be of an educational value.

THE APPLICATION OF LOCALLY PRODUCED FUEL IN REDUCING TRACTOR FARMING COSTS.

[E. V. HAMMATT, Lameroo.]

The necessity of being able to equip mechanically propelled vehicles to operate on other than liquid fuels has for a long time been realised by the farming community, and it is keenly appreciated that the scope of the tractor and truck would be considerably increased were it possible for them to use locally produced fuel.

Many inventors during the last few years have exerted their talents and energy towards this end, and as a result many machines have been produced that are giving more or less successful results. Notwithstanding this fact, the writer was not deterred in his attempt to evolve something apart from the orthodox, and to claim in the plant which is the subject of this paper results far in excess of all others yet demonstrated.

PRODUCER GAS.

The most satisfactory solution to this appears to be the use of producer gas—the second cheapest and best of all artificial fuel gases used in internal combustion engines. The general adoption of this class of power would result in a very large reduction of tractor farming costs. Furthermore, it would retain thousands of pounds in the State that are sent out of it for liquid fuel, and materially assist in providing employment for a number of men in preparing fuel for use in gas producers.

My plant has been working on a tractor on my farm for the last 20 months continually, and the tractor works very efficiently on gas, doing all that is asked of it in the same way as if it were running on liquid fuel. This was obtained mainly be certain alterations to pistons to obtain higher compression. The plant itself is attached firmly to the tractor and is so light—only weighing 6cwts.—that it does not upset the balance of the tractor; actually, it can be so placed as to compensate any inefficient draw-bar loss.

Charcoal costs 1s. per bag, therefore the purchase of petrol and oil are the only additional fuel outlay. A remarkable saving in engine oil is effected by changing once in 200 hours instead of every 50. With liquid fuel there is definitely no crankcase dilution, the oil getting thicker instead of thinning out. Longer engine life is obtained and less overhauls are necessary running on cooled charcoal gas than on oil of high volatility. The gas producer comprises a generator fitted with a hopper carrying enough charcoal for approximately 4 hours running without stopping motor, a recharge which only takes a few minutes. The gas is cooled and filtered through scrubbers, and cleaned before it passes to the mixer where it is mixed with air ready for combustion in the tractor engine.

The producer uses 1½galls. of water an hour, and the tank capacity lasts as long as the charcoal in the hopper. Petrol is used for starting the engine and to create a suction to draw the gas through the scrubbers. It requires 1½ to 2 pints of petrol for starting from cold, which takes about 10 minutes.

[*Papers Read at Conferences.*]

Operating a gas plant is very simple—the air supply to the mixer and water drip to the generator are the only operations needed, for when once moving under full power it runs consistently and requires no adjusting.

COSTS.

The following are the working expenses for a caterpillar tractor worked on my farm both with liquid fuel and producer gas:—

Pulling 20 Sun Combine Drill.—400 *Acres.*

Liquid Fuel.	£	s.	d.	Gas.	£	s.	d.
185galls. kerosene at 1s. 0½d. ..	9	12	8	50½ bags charcoal at 1s.	2	10	6
15galls. petrol at 1s. 7d. ..	1	3	9	11galls. petrol at 1s. 7d.	0	17	5
12galls. B. oil at 5s. 6d. ..	3	6	0	4galls. B.B. oil at 5s. 6d. ..	1	2	0
	£14	2	5		£4	9	11

Pulling 8-Furrow Heavy Fallowing Plough.—550 *Acres.*

Liquid Fuel.	£	s.	d.	Gas.	£	s.	d.
440galls. kerosene at 1s. 0½d. ..	22	18	4	145 bags charcoal at 1s.	7	5	0
30galls. petrol at 1s. 7d. ..	2	7	6	20galls. petrol at 1s. 7d. ...	1	11	8
24galls. B. oil at 5s. 6d. ..	6	12	0	8galls. B.B. oil at 5s. 6d. .	2	4	0
	£31	17	10		£11	0	8

Pulling 10/ft. Royal Header.—440 *Acres.*

Liquid Fuel.	£	s.	d.	Gas.	£	s.	d.
210galls. kerosene at 1s. 0½d. ..	10	18	9	105 bags charcoal at 1s.	5	5	0
18galls. petrol at 1s. 7d. ..	1	8	6	13galls. petrol at 1s. 7d. ...	1	0	7
12galls. B. oil at 5s. 6d. ..	3	6	0	4galls. B.B. oil at 5s. 6d. .	1	2	0
	£15	13	3		£7	7	7
Grand total for 1,390 acres	£61	13	6		£22	18	2

BREEDING AND FEEDING PIGS FOR MARKET.

[E. A. DAVIS, Pinnaroo.]

Owing to the possible trade with Great Britain by exporting pig products, it behoves every farmer to seriously consider turning portion of his grain into pork and bacon, thus returning a more payable price for grain, reducing the huge surplus that there is in the world at the present time, and bringing about a big saving in cornsacks. The grain used for the purpose of feeding to pigs can be put into secondhand bags for two or three years, or in super bags that have been washed and cared for in such a manner as to make them safe for further use. We need not reckon on saving only wheat, because barley and oats are excellent feeds, barley being the best of the three, while the other two cereals play their part.

Barley can be grown profitably; it can be sown before or after wheat. If sown before quite a lot of grazing can be obtained from it, and if not grazed too long will yield a good return. On the other hand, it can be sown late, which is considered to be the best time to sow if high yields are required. This is a matter of seasonable conditions. Oats, too, can be grown profitably and easily if only grain is required. Assuming that the grain is available it is as well, before obtaining any number of pigs, to make the necessary yards and pens, always allowing for and keeping in mind room for expansion.

HOUSING.

Sties are not necessary to any great extent; they are only required for farrowing or finishing for market; the sow only needs the use of a sty for three weeks, and pigs that are being finished about the same time. Sties can be erected easily with a few mallee forks and rails to form the skeleton for a straw roof. Straw is

warmer in winter and cooler in summer than iron. An excellent floor can be made from old railway sleepers laid the reverse side up to what they previously have been, and placed about 1in. apart, giving the floor a very gentle slope to provide drainage. They can be grouted in with cement to prevent them from collecting refuse and making it impossible for the pigs to root up the floor.

Four pens measuring 8ft. x 12ft. will be sufficient for 6 or 8 sows; one sleeper will cover approximately 6 square feet, which means that 16 are required for 1 pen. These can be obtained locally for about 1s. or 1s. 6d., plus 1 bag of cement at 8s. 6d., making the cost of 1 pen between 24s. 6d. and 32s. 6d. This is very cheap, and will last a lifetime.

Make the grazing paddock secure by placing 3 barbed wires around the boundary about 4in. apart, and strain tightly. If this is done ordinary fowl netting will hold most pigs. For shelter straw stacks are best. Pigs are clean if kept clean; they will always choose and keep one corner of their sty as a privy, which should be cleaned out every second day at least, and the bedding not allowed to become wet, or dry, or dusty; throw out and renew as it is required. Give the floors a wash once a week—not only do the pigs appreciate it, but it keeps down the smell so often noticed where pigs are kept. The pigs, too, will enjoy the hose being turned on them, but see that this is not done in the evening or they may catch cold.

Sire and Dam.

Having decided to keep pigs as a sideline, it is essential to immediately fix on the type and class of pig that brings the highest price at the market, and which is most sought after by butchers and curers. Examine which pays best, to feed for export or local market. Having made a decision, rigidly adhere to it.

Before good pigs of any breed can be produced it is first necessary to have a good mother and a good sire. When these are available it will be possible to raise twice as many pigs, and each pig will be worth twice as much as animals obtained from a poor mother and a poor sire. Remember, a poor pig eats more than a good one. Pigs that will grow rapidly and large, and make the most pork out of their feed, cannot be raised unless the mothers and sires are from pig families that produced big, thrifty pigs. Breeding counts in pigs just as it does in any other stock. The brood sows must raise as many good pigs as they can—that is what they are kept for. If the foundation sows are not the very best, and the very best cannot be procured, select the best available and use a good sire, and from the litters select the best sows each year.

No matter how much good feed is fed to pigs, no matter how well sheltered and free from disease they may be, they will not make the best job of converting feed into pork or bacon unless they have the right kind of breeding. Let farmers not fool themselves that any kind of pig will do—a good sire is essential. Sometimes there may be an excuse for using a nondescript sow for a breeder if it is not possible to obtain a better one, but there is no excuse for using an inferior sire. There are good sires within reach of all, and it is a money-losing mistake to use anything but the best sire. The way to improve common stock is by using good sires.

Type of Pig.

The pig needed for present-day requirements is one with a long body, lean, fine shoulders, and light in the jowl; but not too leggy, with plenty of chest room, with the bulk of weight behind the shoulders and side, becoming deeper towards the hindquarters. If suckers are to be bred—which is the cheapest way to get them—select a sow from a litter whose ancestors have been big producers and quick growers, possessing a strong constitution. From the litter choose the biggest and best pig, provided that it is of good type and conformation, and with an active appearance. Sows should not have less than 12 teats evenly spaced and placed as near to the fore legs as possible. It is important that the teats should be of an

even size—small teats are usually blind. Having selected the sow, give her plenty of run; do not cramp her in a small sty. A grass paddock is preferred in which is provided a self-feeder with minerals added.

At the age of from 8 to 9 months mating should take place to a selected boar. Obtain the service of a sire that has been selected on the performance of its sire and dam by years of very drastic culling, and who possess a record to back up their ability to produce quick growing, early maturing pigs of a uniform size. In each case the pig selected should be a pure-bred animal. The sow, too, should be pure in this respect, although it may be a cross its parents should be pure bred, possessing the same record as the boar.

Farrowing.

Both sow and boar should be handled as much as possible, and with every care not to knock them about, or this will surely bring trouble from the sow at farrowing, and the boar will become a nuisance if he is vicious.

Having mated the sow she should have every care and plenty of good feed to keep her in good heart, but do not feed to fatten; all that is required is good, solid condition. About a fortnight prior to farrowing she should be brought into a pen and fed on sloppy food, with a dose or two of Epsom salts. This should be done twice before she farrows. At farrowing it is as well to be at hand to remove the young pigs from the sow, dry them with a dry bag or cloth, and put them in a box with a little fine straw, fix the box high up in the sty so that the sow cannot get to them. Be particular that there are no draughts. After the sow has finished farrow put the young pigs to the teats and allow them to have a good feed. If it is night take them away for the night, thus allowing the sow to rest undisturbed until morning. It must be remembered that this litter is the means of profit or loss on the preparatory feed that has been given to the sow. Therefore, it is well to give her 3 or 4 days' attention by taking the pigs away after every drink—about every 2 hours—until 10 at night; then take them away for the night. Continue this practice for a week, by which time the little pigs are able to care for themselves.

The loss of young pigs is something of very great importance. Suppose it costs £4 per year to feed each sow. If she only rears 2 pigs, each pig has cost £2 the day it is born—very high-priced pigs. If she raises 4 pigs, each one costs £1—not much chance of a profit. If she raises 2 litters of 10, the first cost is very reasonable. Therefore, do not neglect the sows at farrowing. A week spent this way and doing odd jobs in between is the best pay a man will receive for any week that he works on his farm in the year. When one sees a sow with 2 pigs for which she has been fed 4 months the sow is blamed; often it is not the sow but that man who is at fault.

Raising the Litter.

The litter must be given proper attention, first by feeding the sow well while she is suckling, but do not rush the feed, continue to feed her as she was fed before farrowing, gradually increasing as the pigs grow. Do not change her diet; this will affect the young pigs, and probably cause scours at about a month old. Should this occur, give each pig 1 teaspoon of castor oil, and if this fails repeat the dose. This trouble is usually caused by change of diet, dirty floors, or the sow lying in a filthy sty and the young pig shaving to suck it off when drinking. This also infests them with worms. At 3 weeks of age the young pigs will start to eat. They should have a shallow trough with a little milk placed where the sow cannot get at it. This will relieve the sow, as they will not need so much from her. From this stage the sow and young pigs should be on pasture with a shelter provided. The young pigs should have access to the self-feeder. This can be kept away from the sow by means of a creep—a small pen with the opening just too small for the sow to get through. After 10 weeks the sow should be taken away from the young pigs and mated during that week to the boar.

These pigs should now be kept going with minerals added to their feed, together with crushed grain and meat meal at the rate of 4½lbs. per 100lbs. grain or ¼lb. of meal per day per pig and skim milk if available. Meat meal should always be fed to pigs; it supplies protein which quickens the growth, and the pigs are sold earlier, which means greater profit. Supposing the average pig was sold at 6 months it would cost approximately 3s. 4d. per head for meat meal. To sell them at from 5 to 5½ months means a saving in feed, and while the cost is slight it means a saving of 1s. per head, and if 10 are reared, 10s. on the litter besides grain.

Worms and Lice.

Worms can be effectively treated in many ways. One of the best is the use of turpentine. They can also be treated with worm capsules which are given to each pig individually at a cost of under £1 per hundred; only 1 is necessary for each pig. Pigs should be dosed at weaning time; it is not recommended before. Keep a lookout for lice. No pig will thrive if these pests are allowed to suck their blood. Old sump oil will stop this pest.

Topping Up.

Assuming that the pigs are nearly ready for market, bring them into a sty and top them off with grain. It will take about a fortnight to complete this. Supply good bedding and keep them clean; do not think that they can be hurried away; much money is lost by pigs not being finished, and there is as much lost by overdoing them. Their condition should be sleek, with a firm fat over the backbone just sufficient to avoid the bone from being felt easily. The skin must be soft, and the hair glossy. Do not allow the pigs to be hit, or bitten by dogs, which lowers their value.

No matter how good the feed do not lose sight of the fact that profits come from the number reared per sow per litter. It does not seem much when a little dead pig is thrown over the sty wall, but do not forget that represents about 100lbs. that the sow has eaten. Many thousands of young pigs are lost through neglect. If pigs are worth keeping they are worth the same attention as horses, cattle, or sheep.

SOME FACTS THAT WILL HAVE TO BE FACED DURING THE NEXT YEAR.

[W. J. Morcom, Lameroo.]

There will be many problems to face during the next 12 months, for as seasonal conditions this year do not give promise of a big harvest, the farmer will have to plan well ahead and work accordingly, so that he may be able to carry on and keep his stock, &c., in working order. This year there are many farmers who are not fallowing; they say that they will be putting in the same land again next year. That is a mistake, and even in a year like this it is essential to fallow, for by having fallow reasonably clean should next year open early with a good rain some quick-growing variety of wheat could be sown early, even in April, and that by July would probably give an abundance of good greenfeed, which could be fed off even by working horses next fallowing time, for hay stacks will not be too plentiful this year.

Some also say that they cannot fallow, for if they do they will not have any feed for their sheep. So far as that is concerned, all the feed the sheep are getting from a lot of paddocks that could be fallowed is very small, in fact, some land that was fallowed early has almost as much feed on it as that which was not fallowed.

There is another point that must not be overlooked when harvest time comes; we will have to bind the best of our wheat crops for hay, otherwise there will be a lot of hungry horses about next year, and it will pay to bind some of it a little

on the ripe side, then if needs be some of it could be headed or threshed and chaffed with good hay, and it will make good feed. Any straw will have to be cut also, for it is much better to cut it than to be raking it up later on. These jobs mean a lot of work, but they will have to be done.

It will also be a good plan to sow a portion of the stubble land, especially the sandiest portion, with rye, because that will grow quickly and provide pasture for sheep. Of course, I mean by that if the season is normal so that these things will grow, but we must make provision and do our part if we are going to maintain our stock on the farm. A farm without stock is a very poor advertisement, but it will pay to get rid of all old sheep if possible and rely more on the younger sheep as they can stand more hardships than old ones.

There is also the cocky chaff from harvesters and headers; it will pay handsomely to save all we can of this, for young horses and cattle will do well on it—especially if a little hay chaff and molasses are mixed with it—much better than running out licking up sand which causes a lot of trouble.

We can also make a saving as far as our haystacks are concerned by using more corn and less chaff. In normal times we do not notice this so much, but now it is necessary to be careful. Horses being fed in the paddock at midday from nosebags can—with ¾ of a kerosene tin of chaff and ½gall. of crushed oats and wheat mixed—have quite a good feed in three-quarters of an hour, and are ready for work, and can be unyoked earlier in the evening. If horses are given a fair corn allowance they will be hardier and work more satisfactorily. A good lick for horses is salt and super (50-50) mixed with molasses. They are very fond of it, and it helps to keep them healthy, stops them from rubbing down the fences and eating manure that is lying about the yard.

In conclusion, may I say I have only quoted these facts from the way the season is now? Should we get a wet spring things may be different, but we must face the facts as they present themselves to-day and be ready for any emergency that may arise.

WHAT OF THE FARMER OF TO-MORROW?

[M. S. Davis, Parilla Well.]

Our State being mainly devoted to primary production, we hear the cry "the farmer is the backbone of the country," and concern is shown at the desire of men and women to leave the land for the comforts and privileges of cities.

Compare circumstances and existence under each heading—city *v.* country—the city folk have education, regular hours, home conveniences, social, religious, and sporting advantages, and at least a living wage equivalent to the amount of work done. Compared with the country—isolation, educational limits, burden of debt, hours of work extending from daylight to dark, lack of home conveniences and necessities, and a limited outlook and status.

The question may be asked, "Why do men stay on the land when their lot is so hard, and why is it that some people on the land seem to know nothing of the disadvantages stated above?" The country is not concerned about these types of people, for some have inherited properties free of encumbrance, or have secured a cheap property and have had good seasons, or selected land years ago and have been rewarded by thrift. Others remain on the land because it is part of them or seems to be in their blood, and so they struggle on against adverse circumstances, environment, and conditions, hoping that their children may have it easier, and to-day the majority are in these circumstances, and their children are the ones that are going to be to-morrow's farmers if we can hold them, and how to do it is to-day's problem.

What has brought about this condition—bad seasons, low prices, and interest. The farmer's son is brought up under the gospel of "get rich quick and retire"; he is told of the wonderful crops grown on new land or stubble or ploughed-up

[Papers Read at Conferences.]

land put in when seasons were good and wet; rarely do we hear of the wonderful results obtained from a perfect piece of fallow in a dry year, and we have developed into cropping for wet years irrespective of lean times coming, and have allowed stock and plant to get too big and overhead expenses become so heavy that we have found ourselves at a loss. Those in authority have been just as much to blame; it is either, grow more wheat, keep more sheep, profit in cows, or feed corn to pigs and poultry, until we find the farmer chopping and changing from one to the other, paying high prices, and just being established in one branch when it is becoming glutted, and very often we see the press booming someone who is doing well at some particular sideline, and crowns it by saying the farmer could not make it pay if he had to pay wages to employed labour, but his family do the work and show a profit.

That parent is foolish, for any son or daughter on the farm is worth infinitely more than any hired servant, and should he or she work for less? Why will not the boys stay on the farm? Because they work for nothing until they want to get married, and then try and start on their own with a young wife and growing family, and all they know is how to work, to say nothing of the expense and management of a property, because father has done all that!

Consider this question with a balanced mind and it will be seen how serious the position is and how vital it is to the maintaining of our status as citizens of equal rights with those under other circumstances. The farmer's son attends the local country public school, and at the age of 14 is ready to leave and at the same time the parent would like to give him extra education, but cannot afford to because the son can drive the plough and save a man's wages and keep.

He will prove the best man that ever worked for the farmer, and if helped and given hints he will be a better man than his father, and when all is said and done that is what a parent wants—for his son to be the best farmer in the district.

Now consider his education to attain this end, other than being a Bureau member. The boy after leaving school is bound to become very keen on his job, and may become so engrossed in his work that he is liable to lack doing anything to keep his mind fresh and go on learning from where and what he had learned at school.

The first thing to do is to buy him a diary and see that he writes it up every night, and if you have never kept one you will become enthusiastic about it and its records, and so will your son, and it will be an eye-opener as to how long it takes to do a certain paddock, how large it is, how it was worked, what wheat was sown, when stock were put in it, when moved out, the time the season broke, when dry spells occurred, the times of the mating of all farm animals, and in this way receiving gradually his education. Let him keep account of a certain paddock, cost of rent, taxes, and rates, feed consumed in fallowing, working, seeding, not forgetting his own wages, and both you and particularly the boy will know the wheat in the bag is not all profit as people are so often apt to pass judgment.

It may be said this is not necessary on a farm but it definitely is, for the city dweller is trained in all departments before he is started in his own business and, what is more, he has been getting all he earned, and the farmer of to-morrow will have to be treated the same if we are to hold him. If records such as mentioned were kept farmers would not suffer from land booms as in the past. Let the farmer of to-morrow take an interest in a few sidelines, and let him have pedigreed livestock and learn the art of judgment, selection, culling, feeding, and marketing, as well as cost and profit.

One only has to follow the work of the Home Project to see its value. We should have carried on from school keeping accounts and working out profit and loss until we could meet our city cousins on equal ground. Not one farmer's son in 10 can make out a balance-sheet, not because it is beyond their powers, but because they have not been taught or had the opportunity of learning.

[*Papers Read at Conferences.*]

The pioneers are often congratulated for what they have done, but what have many left to-day in their old age but poverty and worry? We want the settler of the right class and kind to go pioneering, and he will have to have conveniences and home comforts provided.

Circumstances have changed, and so will the application have to alter if the farmer of to-morrow is going to be competent and satisfied, for he must be trained in his business and be able to conduct that business, and in co-operation be able to maintain that freedom of action, spirit, and application so necessary to a contented and successful rural population.

The position is one-sided and is not going to last, for the farmer of to-morrow will be a slave and not a citizen of equal social standing as is his city cousin. And not until we see that our sons and brothers are better educated and equipped and catered for are we going to get the rights due to the farmers, their wives, and their children, nor will success be reached with land settlement. In working for this end, let it be taught that farming is a business or a life's work of development and industry, not a mine to be exploited, make a fortune, and then get rid of it. Instil into the mind of the farmer of to-morrow that he is engaged in an honourable business, and let him develop that feeling and pride that he must be educated and equipped to develop that farm more than ever, because it has been in the family name for so many generations.

AGRICULTURAL BUREAU CONFERENCE.

The Annual Conference of Branches of the Agricultural Bureau situated in non-irrigated fruit-growing districts was held at Balhannah on November 6th.

Mr. C. W. R. James presided and Mr. J. B. Murdoch (Advisory Board of Agriculture) delivered the opening address. There were also present Messrs. H. N. Wicks (Advisory Board of Agriculture), A. G. Strickland (Deputy Chief Horticultural Instructor), H. B. Barlow (Chief Dairy Instructor), R. Fowler, E. Leishman, H. H. Orchard, and J. B. Harris (District Horticultural Instructors), and H. C. Pritchard (General Secretary).

The following papers were read and discussed:—"Thrift," by Mr. W. G. Ahrens (Light's Pass); "Prevalence of Gummosis in the Barossa District," by Mr. Bert Boehm (Light's Pass); and "Some Points Worth Considering when planting an Apple Orchard," by Mr. C. G. Grasby (Balhannah).

Mr. Strickland replied to several questions dealing with the steps which are being taken to prevent the introduction of Oriental Peach Moth, methods of removing spray residues, the use of sulphur as a soil amendment or as a deterrent to insect or fungus pests, the cost of installing a central spraying outfit in a 50-acre orchard, and the control of pear bark canker.

The following resolutions were carried:—(1) "That it be a recommendation to all fruitgrowers to burn cuttings within one week after pruning"; (2) "that experiments be carried out on early and late ploughing for fruit trees"; (3) "that the next Conference be held at Lyndoch"; (4) "that the Government and all other landowners take all possible steps to eradicate cape tulip"; (5) "that the Postal Department be asked to relax the very rigid three-minute law in connection with trunk line telephone calls.""

In order to add to the educational value of the Conference and to illustrate the quality of produce of the district, the Balhannah Branch staged a most effective display of fresh fruit and many kinds of preserves. Trophies won by the Branch in various competitions were also on view, and a particularly attractive group of wood-turned articles, exhibiting skilled workmanship, engaged the special attention of delegates during the day.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.

SEPTEMBER, 1934.

IMPORTS.

Interstate.

Apples (bushels)	70	Bulbs (packages)	10
Apples, custard (bushel)	1	Plants, ornamental (packages)	71
Bananas (bushels)	14,933	Plants, vegetable (packages)	2
Citrus—		Plants, other (package)	1
Lemons (bushel)	1	Seeds (packages)	49
Oranges (bushels)	68	Shrubs (packages)	8
Passion Fruit (bushels)	165½	Trees, fruit (packages)	11
Paw Paws (bushels)	29	Trees, ornamental (package)	1
Pineapples (bushels)	1,795½	Wine casks (No.)	2,471
Strawberries (bushel)	1		
Tomatoes (bushels)	3	*Fumigated*—	
Nuts—		Citrus—Oranges (bushels)	54
Cocoanuts (bags)	3	Wine casks (No.)	57
Peanuts (bags)	762		
Peanuts, kernels (bags)	56	*Rejected*—	
Beans (bushels)	53	Citrus—Oranges (bushels)	4
Cucumbers (bushels)	90	Passion fruit (bushel)	1
Onions (bags)	492	Plants, vegetable (package)	1
Potatoes (bags)	15,480	Secondhand bags (No.)	2
Potatoes, sweet (bushels)	8	Secondhand cases (No.)	3

Overseas.

(State Law.)

Wine casks (No.)	338	*Fumigated*—Wine casks (No.)	46

Federal Quarantine Act.

	Packages.	lbs.		Packages.	lbs.
Seeds, &c.	4,617	861,122	Cocoanut chests	424	—
Plants	1	180	Tea chests	1,704	—
Canes	130	—	Timber	208,286	1,494,412 sup. ft.

EXPORTS.

Federal Commerce Act.

		Packages.			Packages.
England	Citrus—Oranges	1	Singapore	Citrus—Oranges	111
India	Citrus—Oranges	95		Lemons	22
	Other vegetables	108		Other vegetables	172
Netherlands, East Indies	Citrus—Oranges	50	Straits Settlements	Potatoes	5
	Other vegetables	20		Other vegetables	11
New Zealand	Citrus—Oranges	23,771	Tonga	Potatoes	13
	Seeds	27		Other vegetables	13

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co. reported on November 1st, 1934:—

BUTTER.—Conditions in regard to dairying have very much improved during October as the general rains and absence of hot drying weather resulted in the feed growth being maintained, and, consequently, supplies of cream and butter kept up well. The season's production, however, in aggregate has been much less than last year, and the peak was reached last week. The London butter market has shown a little improvement owing to a better movement of trade in Germany and overseas prices advanced. This was reflected by a hardening in rates in the local markets, and, under the Equalization Plan better prices were paid for butterfat. Local print trade was well maintained throughout the month and also fairly regular supplies were sent to Broken Hill. Present prices in the Adelaide markets are:—Choicest creamery fresh butter in bulk, 1s. 2½d. per lb.; prints and delivery extra. (These prices are subject to Stabilization Levies.) Store and collectors' lots, 5d. to 5½d. per lb. according to quality.

CHEESE.—Considerable quantities were exported throughout October, and as production steadily increased, this lifting of surplus relieved market from week to week. Westralian buyers purchased regularly and local traders' requirements were met. The cheese manufacturers also have a plan operating for stabilising prices so that rates have continued steady at:—Large and medium, from 8d. per pound.; loaf, from 8½d. per pound at store door, delivery extra; semi-matured and matured, 8½d. to 9d. per pound.

BACON.—Turnover was well maintained and consumption was at a higher level than for October of last year. This was due to the fact that more bacon is consumed during the cool weather than during hot spells. Curers consigned ample supplies to the open markets, which were cleared from week to week. Increased interest was shown in hams both for current trade and for forward delivery and values for bacon and hams firmed during the month. Best quality sides, 9½d. to 9¾d. per pound; middles, 10¼d. to 10½d.; rolls, 8½d. to 9d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 3d. to 1s. 4d. per pound; lard prints, 5½d. per pound.

EGGS.—A strong demand continued throughout the month under review, and with exporters working at full pressure all that would pass the graders for quality were shipped abroad. Considerable quantities were manufactured into pulp and floors were kept nicely cleared from day to day. Production in eggs this season seems to be less than last season although a greater proportion has been exported. Values have fairly well maintained although there was an easing towards the end of the month. Present rates are:—Ordinary country eggs, fair average quality, 7d. per dozen net; long distance rail or shipping eggs, lower; Export quality, clean eggs, 1⅞ozs. and over, up to 9½d. per dozen net.

ALMONDS.—Moderate supplies were received from week to week, but good steady demand absorbed all that were offering, and values were steady at:—Softshells and Brandis, 9d. to 9½d. per pound; hardshells, 5½d. to 6d. per pound; kernels, 1s. 11½d. to 2s. 0½d. per pound.

HONEY.—Sales were disappointing, and considerable unsold stocks are held by merchants and also by apiarists. Rates are:—Prime quality clear extracted, 3d. to 3½d. per pound; lower grades, 2d. to 2½d. per pound.

BEESWAX.—Met with ready sale, although quantities offering were not very great. Values continue steady. 1s. 4d. to 1s. 4½d., according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday, and our sale rooms are the best equipped in the State. There is a specially strong demand at present for live poultry, and prices ruling are higher than for many months past. Supplies, at recent sales, have been short of requirements so that consignors are advised to forward any surplus straight away rather than delay until closer to Christmas. Crates loaned free on application. The following are rates realised:—Prime roosters, 4s. to 5s. 6d. ; nice-conditioned cockerels, 3s. 3d. to 3s. 10d.; fair-conditioned cockerels, 2s. 6d. to 3s. 2d.; chickens, lower; heavyweight hens, 3s. to 3s. 9d.; medium hens, 2s. 6d. to 3s.; light hens, 2s. 2d. to 2s. 5d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 5s. to 6s. 6d.; young Muscovy ducks, 2s. 9d. to 3s. 9d.; ordinary ducks, 1s. 9d. to 2s. 9d.; ducklings, lower; geese, 3s. 6d. to 4s. 6d.; goslings, lower; turkeys, good to prime condition, 10d. to 1s. per pound live-weight; turkeys, fair condition, 7d. to 9d. per pound live-weight; turkeys, poor and crooked-breasted, lower; pigeons, 5d. to 7d. each.

POTATOES.—Good, old season's, 11s. per cwt.

ONIONS.—Good, old season's, 11s. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of October, 1934, also the average precipitation for October, and the average annual rainfall.

Station.	For Oct. 1934.	Av'ge. for Oct.	Av'ge. Annual Rain-fall.
Far North and Upper North.			
Oodnadatta	0·60	0·42	4·69
Marree	1·23	0·45	5·93
Farina	1·23	0·48	6·48
Copley	1·39	0·46	7·93
Beltana	0·44	0·53	8·53
Blinman	0·86	0·76	11·92
Hookina	0·78	0·58	11·46
Hawker	1·10	0·79	12·31
Wilson	1·15	0·87	11·82
Gordon	1·03	0·76	10·59
Quorn	1·07	1·09	13·29
Port Augusta	1·36	0·84	9·46
Bruce	1·32	0·78	9·95
Hammond	1·43	0·94	11·27
Wilmington	3·02	1·44	17·43
Willowie	1·83	0·97	12·28
Melrose	3·57	1·98	22·94
Booleroo Centre	2·84	1·29	15·23
Port Germein	2·62	1·08	12·55
Wirrabara	3·07	1·63	19·34
Appila	2·58	1·31	14·66
Cradock	0·98	0·85	10·83
Carrieton	1·60	0·95	12·29
Johnburg	1·52	0·83	10·59
Eurelia	1·54	0·98	12·85
Orroroo	2·18	1·06	13·23
Nackara	2·62	0·72	11·18
Black Rock	2·24	0·98	12·43
Oodlawirra	2·04	0·56	11·67
Peterborough	3·05	1·08	13·27
Yongala	2·34	1·23	14·47
North-East.			
Yunta	0·72	0·68	8·54
Waukaringa	0·41	0·65	7·97
Mannahill	0·96	0·74	8·21
Cockburn	0·97	0·61	7·98
Broken Hill, N.S.W.	1·56	0·76	9·57
Lower North.			
Port Pirie	2·49	1·20	13·26
Port Broughton	2·44	1·18	13·92
Bute	2·25	1·33	15·49
Laura	3·46	1·66	17·99
Caltowie	2·81	1·51	16·75
Jamestown	3·31	1·67	17·75
Gladstone	3·51	1·51	16·33
Crystal Brook	3·89	1·45	15·82
Georgetown	2·11	1·65	18·41
Narridy	2·32	1·38	15·88
Redhill	2·37	1·44	16·61
Spalding	2·35	1·70	18·99
Gulnare	2·05	1·66	18·71
Yacka	1·71	1·32	15·40
Koolunga	1·42	1·37	15·43
Snowtown	1·77	1·37	15·71
Lower North—*continued.*			
Brinkworth	1·47	1·33	15·83
Blyth	2·16	1·46	16·80
Clare	2·81	2·11	24·56
Mintaro	2·78	2·06	23·47
Watervale	3·05	2·32	26·91
Auburn	3·90	2·14	24·00
Hoyleton	2·05	1·59	17·35
Balaklava	2·22	1·41	15·49
Port Wakefield	1·44	1·11	12·96
Terowie	2·80	1·14	13·40
Yarcowie	2·60	1·14	13·63
Hallett	2·06	1·45	16·48
Mount Bryan	2·30	1·31	16·81
Kooringa	2·14	1·66	17·92
Farrell's Flat	2·33	1·64	18·68
West of Murray Range			
Manoora	3·06	1·73	18·93
Saddleworth	3·44	1·74	19·61
Marrabel	2·49	1·78	19·94
Riverton	3·00	1·86	20·81
Tarlee	3·20	1·61	18·13
Stockport	3·09	1·56	16·97
Hamley Bridge	3·15	1·45	16·61
Kapunda	2·46	1·82	19·82
Freeling	2·36	1·64	17·88
Greenock	2·91	1·96	21·57
Truro	2·48	1·81	19·95
Stockwell	2·65	1·80	20·17
Nuriootpa	3·09	1·82	20·72
Angaston	2·61	1·97	22·47
Tanunda	2·80	1·94	22·03
Lyndoch	2·69	2·12	23·46
Williamstown	2·56	2·35	27·77
Adelaide Plains.			
Owen	2·46	1·26	14·53
Mallala	2·34	1·48	16·59
Roseworthy	2·69	1·65	17·39
Gawler	2·24	1·72	18·97
Two Wells	1·94	1·39	15·75
Virginia	2·15	1·46	17·18
Smithfield	2·61	1·51	17·65
Salisbury	2·30	1·57	18·59
Adelaide	2·00	1·72	21·15
Glen Osmond	2·63	2·11	26·03
Magill	2·55	1·95	25·60
Mount Lofty Ranges.			
Teatree Gully	2·80	2·13	27·33
Stirling West	4·12	3·72	47·05
Uraidla	3·78	3·33	44·19
Clarendon	2·88	2·61	32·89
Morphett Vale	2·55	1·82	22·68
Noarlunga	2·23	1·58	20·41
Willunga	3·17	2·13	26·03
Aldinga	2·96	1·52	20·28

RAINFALL—*continued.*

Station.	For Oct. 1934.	Av'ge. for Oct.	Av'ge. Annual Rain-fall.
Mount Lofty Ranges—*continued.*			
Myponga	3·59	2·08	29·68
Normanville	2·35	1·56	20·73
Yankalilla	2·53	1·64	22·90
Mount Pleasant	2·61	2·37	27·24
Birdwood	2·72	2·47	29·24
Gumeracha	3·34	2·82	33·44
Millbrook Res.	3·59	2·81	34·82
Tweedvale	3·91	2·94	35·97
Woodside	2·60	2·69	32·30
Ambleside	3·05	2·96	34·90
Nairne	3·04	2·42	28·17
Mount Barker	3·39	2·73	31·97
Echunga	3·09	2·82	33·26
Macclesfield	2·62	2·62	30·44
Meadows	3·25	3·03	36·21
Strathalbyn	2·42	1·71	19·32
Murray Flats and Valley			
Meningie	2·60	1·45	18·42
Milang	2·20	1·30	14·97
Langhorne's Ck.	1·98	1·34	14·90
Wellington	1·82	1·34	14·70
Tailem Bend	2·26	1·43	15·08
Murray Bridge	1·69	1·26	13·64
Callington	1·57	1·33	15·22
Mannum	2·19	1·01	11·53
Palmer	1·85	1·44	15·55
Sedan	1·81	1·12	12·11
Swan Reach	1·87	0·96	10·62
Blanchetown	2·53	1·03	11·03
Eudunda	2·79	1·52	17·18
Sutherlands	1·60	0·97	10·88
Morgan	1·62	0·89	9·21
Waikerie	1·16	0·91	9·70
Overland Corner	1·59	0·93	10·37
Loxton	2·70	0·96	11·65
Berri	2·28	0·85	10·32
Renmark	2·37	1·04	10·49
West of Spencer's Gulf			
Eucla	0·69	0·69	9·98
Nullarbor	1·13	0·58	8·84
Fowler's Bay	0·38	0·84	11·93
Penong	0·58	0·84	12·23
Koonibba	0·97	0·99	12·11
Denial Bay	0·66	0·89	11·52
Ceduna	0·72	0·81	10·16
Smoky Bay	0·29	0·75	10·51
Wirrulla	0·42	0·99	10·50
Streaky Bay	0·81	0·97	14·88
Chandada	0·74	—	—
Minnipa	0·80	1·15	13·87
Kyancutta	0·60	—	—
Talia	0·69	0·97	14·63
Port Elliston	1·03	1·15	16·50
Yeelanna	1·09	1·28	16·02
Cummins	1·12	1·35	17·61
Port Lincoln	1·48	1·37	19·43
Tumby	1·03	1·26	14·14
Ungarra	1·55	1·44	16·87
Port Neil	1·43	1·24	13·16

Station.	For Oct. 1934.	Av'ge. for Oct.	Av'ge. Annual Rain-fall.
West of Spencer's Gulf—*continued.*			
Arno Bay	1·49	1·17	12·63
Rudall	1·09	0·99	13·12
Cleve	1·42	1·30	14·79
Cowell	1·05	1·11	11·12
Miltalie	1·54	1·30	13·64
Darke's Peak	0·84	1·26	15·23
Kimba	0·79	0·97	11·84
Yorke Peninsula.			
Wallaroo	1·28	1·16	13·99
Kadina	1·39	1·29	15·69
Moonta	1·78	1·21	15·10
Paskeville	1·96	1·35	15·52
Maitland	1·57	1·60	19·97
Ardrossan	1·80	1·22	13·98
Port Victoria	1·30	1·26	15·49
Curramulka	2·10	1·60	17·95
Minlaton	2·05	1·47	17·85
Port Vincent	2·28	1·22	14·50
Brentwood	2·53	1·31	15·58
Stansbury	2·76	1·43	16·84
Warooka	1·26	1·35	17·53
Yorketown	1·86	1·32	16·94
Edithburgh	2·60	1·27	16·40
South and South-East.			
Cape Borda	2·41	1·54	24·86
Kingscote	2·67	1·36	19·16
Penneshaw	2·48	1·34	19·02
Victor Harbour	3·65	1·76	21·42
Port Elliot	4·12	1·61	19·95
Goolwa	2·94	1·43	17·87
Copeville	2·03	1·09	11·57
Meribah	3·46	0·84	11·46
Alawoona	2·25	0·79	10·29
Mindarie	3·22	1·17	12·22
Sandalwood	2·98	1·23	13·73
Karoonda	2·26	1·36	14·48
Pinnaroo	3·85	1·20	14·57
Parilla	3·17	1·19	14·01
Lameroo	3·20	1·45	16·10
Parrakie	3·04	1·36	14·64
Geranium	2·95	1·47	16·53
Peake	2·53	1·48	16·13
Cooke's Plains	2·28	1·42	15·43
Coomandook	2·74	1·58	17·20
Coonalpyn	2·91	1·59	17·53
Tintinara	3·02	1·61	18·73
Keith	3·98	1·43	17·96
Bordertown	3·63	1·73	19·26
Wolseley	3·92	1·77	18·52
Frances	3·60	1·94	20·01
Naracoorte	3·90	2·01	22·63
Penola	3·62	2·29	26·05
Lucindale	4·79	1·91	23·29
Kingston	3·70	1·72	24·37
Robe	2·74	1·69	24·68
Beachport	3·91	1·75	27·07
Millicent	4·75	2·18	29·81
Kalangadoo	3·56	2·77	32·38
Mount Gambier	3·18	2·45	30·55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. Nov.	Dec.
Meadows	*	21	19
Milang	*	17	15
Millicent	*	30	R
Millicent Women's	553	—	—
Miltalie	*	17	15
Monarto South	†	—	—
Monarto Sth. Wm's	†	17	15
Moorlands	*	21	—
Morchard	†	16	R
Morchard Women's	*	22	—
Mount Barker	*	19	17
Mount Bryan	*	—	—
Mount Compass	*	—	—
Mount Gambier	†	9	14
Mount Hope	*	20	18
Mount Pleasant	534	9	14
Mudamuckla	*	10	8
Mundalla	529	—	—
Mundalla Women's	554	22	20
Murray Bridge	*	28	R
Murraytown	†	—	—
Mypolonga	*	—	—
Myponga	*	15	20
Myrla	*	21	19
Nantawarra	*	15	20
Naracoorte	*	10	8
Narridy	530	—	—
Narrung	*	—	—
Nelshaby	*	—	—
Nelshaby Women's	†	—	—
Netherton	*	21	19
Nunjikompita	†	15	20
Nunkeri	†	15	20
O'Loughlin	*	12	10
O'Loughlin Women's	*	—	—
Overland Corner	*	21	19
Owen	*	12	10
Palabie	*	—	—
Parilla	*	20	18
Parilla Women's	*	21	19
Parilla Well	*	19	24
Parilla Well Women's	*	27	—
Parrakie	*	—	—
Parrakie Women's	†	27	—
Paruna	*	2	7
Paskeville	*	20	18
Pata	*	2	7
Penola	*	3	1
Penola Women's	*	—	—
Penwortham	†	21	19
Petersville	*	20	18
Petina	*	24	22
Pinbong	*	—	—
Pinnaroo	*	—	—
Pinnaroo Women's	*	2	7
Port Elliot	*	—	—
Pygery	*	20	18
Pygery Women's	*	—	—
Quorn	*	—	—
Ramco	†	19	17
Redhill	*	—	—
Rendelsham	*	17	16
Rendelsham Women's	†	—	—
Renmark	†	—	—
Riverton	*	12	10
Roberts & Verran	*	—	—
Rosedale	*	—	—
Roseworthy	*	—	—
Rudall	*	20	18
Saddleworth	*	23	21
Saddleworth Women's	†	6	4
Scott's Bottom	534	17	15
Sheoak Log Wm's.	†	—	—
Shoal Bay	*	20	18
Smoky Bay	*	—	—
Snowtown	†	9	14
Snowtown Women's	*	R	R
South Kilkerran	*	20	18
Springton	*	7	5
Stanley Flat	*	19	17
Stockport	†	R	R
Strathalbyn	*	14	12
Streaky Bay	*	23	—
Sutherlands	*	—	—
Talia	*	30	—
Tantanoola	†	3	1
Tantanoola Women's	†	7	5
Taplan	533	20	18
Taplan Women's	554	—	—
Taragoro	*	15	20
Tarlee	*	—	—
Tatiara	*	—	—
Tintinara	*	—	—
Truro	†	18	R
Tulkineara	*	22	20
Tweedvale	*	15	20
Ungarra	*	22	27
Upper Wakefield	†	—	—
Uraidla & Su'merto'n	*	5	3
Waddikee Rocks	*	17	15
Waikerie	*	9	14
Wallala	†	14	12
Wanbi	*	28	—
Wandearah	*	20	18
Warcowie	†	20	18
Warcowie Women's	556	—	—
Warramboo	†	20	18
Warramboo Women's	559	R	R
Wasleys	*	8	13
Wasleys Women's	557	1	6
Watervale	*	19	17
Wauraltee	*	20	18
Weavers	†	12	10
Wepowie	*	19	17
Wepowie Women's	*	—	—
Wilkawatt Women's	*	20	18
Williamstown Wm's	†	7	5
Willowie	*	26	24
Wilmington	†	13	18
Wilmington Wm's	*	—	—
Wirrabara	*	—	—
Wirrabara Women's	†	—	—
Wirrilla	*	15	R
Wirrilla Women's	558	1	6
Wirrulla	*	21	19
Wolseley	*	12	10
Wudinna	*	—	—
Yadnarie	*	20	18
Yandiah	*	9	14
Yaninee	*	—	—
Yeelanna	*	21	19
Yundi	†	21	19
Yurgo	*	—	—
Yurgo Women's	*	—	—

* No reports received during the month of October. † Held over.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

MUNDALLA (Average annual rainfall, 19.26in.).

June 20th.—Attendance, 20.

FOX POISONING.—Paper read by Mr. R. Dinning:—"For best results in poisoning start before the lambing season commences or young rabbits are about for if left until then there are apparently some foxes that will only eat their own kill. For poisoning in summer or early autumn birds are a very satisfactory bait, especially parrots. For later poisoning nothing is equal to caul fat. A good trail is of special importance, for no matter how good the baits if foxes cannot find them your efforts are wasted. The full carcass of a sheep is good; a ram with horns is all the better. If a smaller trail has to be used drag something else as well to make a mark. A good trail is not necessarily a smelly one; a fresh carcass is far more effective. To prepare the baits I use strychnine crystals. It is quite simple to crush these in a bottle. Get a stick that will fit the mouth of the bottle, cut the end off level, and a few rubs will powder the lot. When using birds for baits cut open the breast and pace the poison inside. For caul fat I cut it into pieces that, when rolled up, make a bait about the size of a magpie's egg; just put the poison on one corner of the piece of fat, and then roll it up. If the fat has been kept in a bag so that it does not get cold it will make up readily, and will soon set once it is made into bait so that it can be thrown from a vehicle quite safely without opening up. Recently I put a number of butter baits on a ploughed field where it was easily seen that the foxes had followed the trail, but with no results. Two nights later I put caul fat baits on the same trail and got five the first night and others afterwards. In laying the baits drop them from the buggy, and if in a place where they have to be picked up I mark the spot with a hoe. About 100yds. apart is a fair distance between baits; if too close or if too much poison is used the foxes travel too far before dying, even if they do not recover. I use as much strychnine as will half cover a 3d. piece. I never use sticks for making the baits, but always the bare hands, and so far this year I know of 65 victims. Too much care cannot be taken with the dogs, and one must be out early in the morning, because crows are apt to pick up the baits and drop them anywhere."

Mr. H. Hinge read the following paper:—"Before commencing with the poisoning of foxes it is important for every landholder to start poisoning early in the season—say, about March and April. My experience shows that foxes may be on one property to-night and on someone else's the next night. Lambs can be saved by poisoning early. Last year we tailed 96 per cent. lambs, but this year I doubt if we will have any more than 60 or 70 per cent. I commenced poisoning last year in March, and found about 50 foxes; but this year I did not start until June. Perhaps this season was not so favourable for a good lambing, but I have found about 40 that the foxes have killed. Do not handle the baits by hand; and, secondly, use only fresh baits from a newly killed sheep. I have had my best luck in early poisoning by using kidney or caul fat. I take the fat while still warm, and cut into pieces about 1in. square; cut a slit, and insert the strychnine, about as much as will cover a 6d. piece. Crystal strychnine gives the best results, and is quite simple to make into a powder. It is a different matter to poison later in the season; the foxes are more cunning. During the last two years I have had excellent results by using young roosters for baits. This is not extravagant, but good value if you can get a 7s. 6d. fox skin for each one. To prepare them as baits, tap them on the head with a stick, being careful throughout not to touch them with the hands. While warm, put a small cut in the head, and also slit open the breast, and put in the poison, taking care to place it down on the liver, &c. Take them out in the paddock and place in thick patches of grass or any other cover that will hide them from the hawks. I put out two roosters, and after waiting over a week found a fox at each. It is important to poison early. If everyone did so the fox pest would soon be a very small one."

Discussion.—Mr. Hinge did not drag a trail when using roosters as baits. He walked and dragged the trail, and lightly covered the baits early in the year, but not later. Mr. Dinning had good results from parrots as baits, and had also found sparrows very satisfactory. Mr. Hinge related how he outwitted a wily old fox by deeply burying a steer and lightly burying some baits nearby. Both speakers agreed that the fresh material was best for the trail. Mr. Lucas asked if S.A.P. would poison foxes. Mr. Dinning said it would clean up crows, but was not suitable for foxes. For strychnine poisoning in dogs, Mr. Dinning used bluestone washed down by water, and Mr. Hinge used salt, followed by milk. Supper was provided by the Women's Branch. (Secretary, A. Ross.)

MIDDLE NORTH DISTRICT.

THE SUCCESSFUL TREATMENT AND PREVENTION OF MILK FEVER.

[*Paper read by Mr. E. W. Richards at the July Meeting of the Narridy Branch.*]

The condition known far and wide as milk fever is one that will always be of interest to the farmer who has good milkers, for it is a condition that seldom occurs among cows that give only a moderate amount of milk. While the condition has to do with milk, it has nothing to do with fever, for the cow that goes to the ground through this condition almost always has a subnormal temperature. The condition has probably existed in past ages, but it has undoubtedly become much more common during the last 50 years, since breeding and selection and feeding have aided the evolution of these new breeds in which the cows give gallons where formally they gave only pints. This increase in the quantity of milk is the keynote which explains the increase in frequency of this condition.

HISTORICAL.

In 1897 there lived in Kolding, Denmark, a veterinary practitioner named J. J. Smidt. At this period bacteria had become fashionable, for the great Lister had introduced his antiseptic practice, and no disease was considered complete unless it had a germ of its own for its causation. Lister's (1827-1912) discovery was that in his day a serious operation meant almost certain death, because almost invariably putrefaction and blood poisoning occurred in the wound made by the surgeon's knife. Lister made the epoch-making discovery that these evils were the result of germs, and that by the use of carbolic acid the wound could be kept antiseptic and proof against action of germs. But for the general use of antiseptics in surgery, which followed Lister's discovery, most of the operations which are now common practice in hospitals could not be attempted at all.

Smidt accordingly reasoned that as milk fever appeared soon after the calf was born, during the days in which the first milk was drawn from the udder, therefore milk fever must be closely related to milk secretion, and the cow's udder must be the seat of germ invasion. By examining the milk of the affected cows with the microscope and finding some large cells in the milk in addition to the usual small ones, he came to the conclusion that the germs infested the udder and caused the cells which secrete the milk to be affected. Had Smidt known more he would have realised that the large cells which he saw floating about in the milk when he examined it by the microscope were the usual cells found in the first milk secreted—colostrum. But it was lucky that he did not know too much, because he at once essayed to kill imaginary germs in the cow's udder by injecting into the udder a solution of iodine of potassium, which he thought would prove a germ killer. To the great joy of Smidt, he immediately obtained splendid results, for all the injected cows recovered, and the good news soon spread far and wide, and many cows' udders were injected. The triumph of his theory was not long lived, for Anderson, of Skanderborg (Denmark) found that it was unnecessary to use the potassium iodide solution, because air pumped into the udder by way of the teats was just as effective; in fact, it had an advantage because the mammary glands (udder) did not suffer so often from mammitis, after air injections. Thus was introduced one of the most remarkable methods of treatment to be found in the whole of veterinary medicine, and this inflation of the udder is the treatment almost universally used by the farmers.

SYMPTOMS, AND TREATMENT BY AIR.

Milk fever is a very common and until recently frequently fatal disease affecting cows, while cases have been known in goats and pigs. As it attacks only the best milkers it causes a severe loss to our dairying industry. It is therefore of great economic importance that dairymen should acquaint themselves with its successful treatment and better still, prevention. It is the disease of heavy milking, well fed cows, and generally occurs between the third to seventh calf, the most active period of the cow. It is confined to heavy milkers.

The earlier symptoms are very often not recognised by the dairyman. At the commencement the animal becomes excited and restless, treads with the hind feet, switches her tail and stares around. She may bellow occasionally and show slight colicky pains. These are followed by weakness at the joints and finally paralysis.

The symptom that is the greatest aid in the diagnosis of the cow is the characteristic position assumed. The head is turned around to the side (usually the left) and rests on the chest causing a peculiar arching of the neck. The body rests slightly on one side, with the hind legs extended forward and outward, and the front legs in

their normal position. The eye is very dull and staring. A drench of 1 cup of coffee boiled in 1 pint of water for 15 minutes and given carefully is a great stimulant to the beast. Milk fever usually occurs within two or three days of calving.

The very successful treatment used by us at present is, when a cow is found down, to disinfect the udder and hands, then inflate the udder with sterilised air by using a milk fever outfit consisting of a needle, air steriliser filled with cotton wool dipped in disinfectant, and a pump. In the absence of the outfit, a bicycle pump and valve may be used, but there is more danger from infections such as mammitis. The udder should be kept inflated until the cow rises, which is usually as long after treatment as she was down before. Strong coffee may be given as a stimulant if the cow appears to be sinking. The beast may die after being down from 18 to 20 hours. This is a successful treatment, but tests show it may impair the milk supply.

THE BIOCHEMISTRY OF MILK.

Milk is a fluid secreted by the mammary glands, but it is not merely filtered fluid from the blood plasma (fluid of blood); the water in blood supplies its bulk, which constitutes 87 per cent. of the milk of the cow. I desire to concentrate attention on its mineral constituents, more especially calcium and in a lesser degree phosphorus, which usually work together.

Calcium exists in the fluid part of the blood in organic combination with the phosphates. It is obvious that the cow when carrying her calf must have a good amount of calcium in her blood so as to supply her calf with calcium, which must be deposited in its bones, especially during the later months of the gestation period.

When fodder is plentiful and the cow is well fed, she takes in more calcium than is required for her daily needs and by the action of vitamin D the calcium is deposited in the long bones of the cow and in other places that act as storehouses for it. By this arrangement the cow can supply the calf, while still unborn, with all the lime that its bones require, and there is still a supply for the milk when it starts to flow after the calf is born.

When, however, the feed is poor and the cow is compelled to live on any grass available she may not receive sufficient lime for her wants, and while still carrying her calf she will be called upon to yield up some of the lime from her own bones, probably leading to that deficiency disease, osteomalacia, and when the calf is born it will have rickets.

It is well known that cows that have been ill-fed and which give only a fair quantity of milk are not troubled with milk fever, but the well-fed cow that gives large quantities of milk is the one that falls victim to this complaint.

She may have been given plenty of calcium in her food and yet within 20 to 40 hours after the calf is born she is found on the ground and unable to rise.

This condition has long been a puzzle, and it is only during the last few years that the cause of the trouble has been worked out, chiefly by Professor Greig of Edinburgh. There have been at least 20 theories to account for it, but the real one explains why milk fever is no fever, but a deficiency disease, due to lack of calcium in the blood.

Observations by biochemists have shown that, when a cow is in good health, if her blood be analysed, it will contain 10 millegrams of calcium per 100 cubic centimetres of blood plasma. If, however, it comes about that the calcium is reduced to 5 millegrams, the cow exhibits the symptoms of milk fever.

Anderson found that, when he emptied the udder of its milk, and then pumped up each teat with air, the cows recovered, but it was not until recently the explanation of this cure has been put forward. It is known that if a cow has a large quantity of milk in her udder soon after the calf is born and this is withdrawn at one milking, the cow often develops milk fever. If, on the other hand, only a small quantity of milk is drawn off and this repeated every 4 hours for a couple of days the cow does not develop milk fever symptoms so frequently.

The explanation of the effect of inflating the udder is quite clear. The air injected into the udder causes pressure on the blood vessels and thereby the quantity of milk secreted is much reduced, As the milk secreted is less, the quantity of calcium withdrawn from the blood is less, and this gives the endocrine glands that preside over the secretion of milk and over the mobilisation of calcium from the bones, time to restore the calcium to its proper percentage in the blood. With this restoration, the symptoms disappear. When a cow goes down with milk fever, it is now not necessary to use the pump to inflate her udder, all that is needed is to inject 300 grains of calcium gluconate dissolved in 12ozs. of distilled or boiled water, under the skin of the cow just in front of her shoulder blade, and when this has been absorbed into the blood, the cow will

throw off all the symptoms of milk fever and get up quite well. The reason is obvious. The calcium has been absorbed in the blood, and the percentage of calcium in the blood restored and all is well. There is no theory about this, it is proof for Professor Greig's experiments show that it is a treatment that is almost invariably successful.

Recently, in Lismore, New South Wales, Mr. Stewart McKay has been writing a series of papers endeavouring to persuade dairy farmers, who have valuable cows, to inject them 12 hours after calving to try and prevent the symptoms of milk fever appearing. The treatment is quite logical. Milk fever is due to the sudden call on the calcium of the blood by the milk secreted during the first days, and this call is so insistent that the calcium stored in the bones of the cow's limbs is not able to be mobilised quickly enough to supply the blood with enough calcium to keep the percentage up above 5 or 6 millegrams per 100 cubic centimetres, and so the cow gradually goes to the ground. If, while the calcium is being withdrawn from the blood, we inject calcium in a form that readily absorbs into the blood, we counteract the bad effects of the withdrawal by restoring the percentage in the blood.

The injection is easily made. It can be made into a vein if a veterinary surgeon does it, but farmers will find the following plan very easy. All that is needed is the apparatus and 300 grains of calcium gluconate dissolved in 12ozs. of distilled water or boiled water. Shave a square inch of the cow's hide in front of the shoulder blade or anywhere else it is found that the hide can be easily pulled up. Thoroughly cleanse the bare spot by washing it with hot water and soft soap, and then disinfect it with tincture of iodine. In the meantime the apparatus is prepared. It consists of a glass reservoir holding 12ozs.; to the bottom of this is attached a rubber tube and to the lower end of the tube is affixed a hollow needle some 3in. long. The whole equipment must be boiled. The fluid is poured into the reservoir and the rubber tube pinched near the needle to prevent the fluid escaping. Then plunge the needle into the hide in a slanting direction so that an inch or more of it will lie immediately under the skin. The solution is allowed to run into the loose cellular tissue which lies between the hide and the muscles. Care should be exercised not to push the needle into the muscle because the fluid will not run into the muscle as easily as it does just under the skin.

WESTERN DISTRICT.

BUTLER.

July 17th.—Attendance, 14.

Colt Breaking.—The following paper was read by Mr. N. Stewart:—"When the majority of primary producers have to look to horse power for strength for the working of the land, colt breaking and handling does not receive proper attention. In many cases the colt is left to run in the paddock until the autumn rains fall, and then is often put straight to team work to do the work of a tried worker. The colt should not be handled more than necessary before it is to be prepared for work, and if at all possible not be allowed in the stable while sucking the mare. Hand feed by all means, but have other places than in a stable with the working horses to do it. The best age for preparing the colt is rising 3-year old. During spring the colt should be driven into a stall where it can be easily caught. A strong rope is essential, and I favour a pair of winkers instead of an open head stall. Tie the colt firmly to a good post in the stall and do not free it until it understands that the rope is there for a purpose. The tail can be drawn, brushed, and combed. This will give the animal confidence and its fear will soon depart. I do not favour mouthing a colt; it is a cruel way of mastering the animal. After leaving the stall, the colt should be first taught to lead. Not much patience is required before it can be led to water. It should then be harnessed and allowed to roam around the yard with a long chain on each side of it to which it will soon become accustomed, and in most cases will not kick at a chain afterwards. I favour putting the colt in the shafts of the wagon for a short period each day; there it can learn what stop and start means and to back. In most cases it will pull on its own account; it should then be ready to take short yoke in the back of a tandem team on the cultivator. A tandem team relieves all the strain of the bit and will do much towards avoiding a sore mouth. The near side in the back is the proper position until it understands what is expected of it. It should only be worked short yokes and not every day for a start. It should be given its freedom through the summer and with handfeeding prior to the commencement of work the following autumn should be easily caught and harnessed and be ready to

take its place in the team. If these suggestions are followed the colt will return good work to the driver as a faithful servant to whom a little consideration and patience have been shown in the time it did not understand what was expected of it.'' (Secretary, C. Jericho.)

EASTERN DISTRICT.

TAPLAN.

July 11th.—Attendance, 15.

EFFICIENCY AND THE PLIGHT OF THE FARMER.—Paper read by Mr. P. R. Hodge (Hon. Secretary):—''The present sorry plight in which the farmer finds himself to-day is due to many causes, as stressed time and again by the various witnesses before the recent Royal Commission on the Wheat Industry. We all know by reading the daily papers, what most of these items are, but few of us are willing to admit to another cause which, to my mind, is one of the main ones, and that is inefficiency. Through various causes and disabilities he finds that it is impossible to do the job as he would like to and knows he should do. Through lack of finance he cannot buy the most suitable implement for the job and has to carry on with an out of date or obsolete machine, when a more modern one would do the job more efficiently, and more economically. The majority of teams in our district are much below strength, through losses, and the remaining horses are in many cases much older than they should be to do the job required of them. Most farmers, too, are unable at present to fence their blocks for the keeping of sheep, or else cannot get the necessary finance for the purchase of them. This means not only a distinct loss of revenue to the farmer, but also prevents him from working his place to the greatest and most profitable advantage, for sheep undoubtedly are one of the main assets of the farmer under present conditions. They not only provide finance when most needed besides meat for the household, but also do valuable work on the fallow, which would otherwise often necessitate the dragging over of a big team and implements. The job is also being done at the right time, as it quite often happens that rain falls when it is not possible to work the fallow, and the sheep have to take the place of the working which may be necessary. Farm buildings probably are not nearly so convenient as may be desired or as they would be had the owner the finance to make them so. We find on moving round the district that buildings in many cases have ceased to carry out the job for which they were built, and the farmer is at a loss to know how he is to renew them. The fact that he is unable at present to do so very often causes serious inconvenience and considerably more work than should be necessary. The same applies to harness and other equipment for the farm, much of which is getting beyond repair. One could go on enumerating these disabilities under which we are all more or less working, and they all lead to inefficiency. How then can we hope to make a success of farming under these conditions? It is an impossibility, but it is possible that in many cases our actual farming methods can be improved on, and in other cases where lack of finance forbids it we can at least aim at better methods. In this regard we must admit that too much unfallowed land is cropped in our district, and it does not need any long itemising of tests and trials to prove this. It has been proved time and again that fallow land produces crops, and often good crops, while stubble and grass land fail. Some of us may not be able through any of the disabilities mentioned earlier, to fallow as much as our neighbour, but we can at least do what we are able to do, thoroughly. The fallowing of more land may necessarily reduce the acreage available for cropping, and this would be in the best interests of the industry and all concerned, for the cropping and handling of the crop, could be done much more economically than the bigger area of stubble and fallow, for probably the same return. The smaller cropping area would in turn allow more time for the proper working of the fallow. In our effort to get as much fallow as possible, however, we must not overlook the matter of how much we can reasonably make a good job of, and keep in good condition, with the plant at our disposal. This is where many of us fail, just as badly as by trying to crop more than we reasonably can, and as a consequence much fallow is cropped which is an insult to the name. Nothing is more pleasing to the eye than a paddock of good clean fallow, and nothing more distasteful than one of unattended fallow. It is unfortunately a fact that some farmers with their present methods could not make a success of it, even under normal conditions, let alone present ones, but if good farming methods are adopted it will probably be possible to hold on through the bad period until conditions improve. In this respect I cite neither my own nor any one else's cases, but I feel certain that no matter what our present or ultimate

position may be, if we aim at the best methods we must sooner or later reap our reward, for method leads to efficiency, and efficiency to success. If it is only in one of the many items connected with our means of livelihood that we can improve, we will get much satisfaction from the fact that it will lead us on to more improvement ventures and ultimate success.''

SOUTH AND HILLS DISTRICT.

MOUNT PLEASANT (Average annual rainfall, 27.18in.).
June 26th.

Di-Calcic Phosphate—A Lick for Stock.—Paper read by Mr. V. Tapscott:—''For many years I have been trying to find something that would prevent cattle from chewing bones, sticks and stones. I tried salt, bone meal and licks without success. The bone meal and licks are rather expensive and some cows will not touch bone meal, nor will horses or sheep. Last year I gave the milking cows a little phosphate in their feed every night and it seemed to work very well, but it contained too much sand. The following is a recommendation of the West Australian Department of Agriculture. Where used as a composite lick made up of 40 parts di-calcic phosphate, 60 parts salt, the following directions are recommended. A few pounds of Epsom salts mixed with the above is an improvement. Milking cows, 4ozs. per cow per day—mixed with food; dry cattle, 4ozs. per cow per day during dry season. Sheep, ½oz. per sheep per day. When there is plenty of green feed it is not necessary or wise to give the lick. I have used this lick with excellent results. The cows are in better form and never seem to be looking for anything to chew. Sheep and horses take readily to it; my horses are in better condition this season than they have been for some time. For sheep, horses, and dry cattle, I put the lick in boxes out in the paddock, the rain does not wash it away but sets it into a hard cake which forms a lick. I have been using it now for about 4 months, and if stock owners were to give it a trial during summer they would be more than pleased with the results. I have fed my cows with loose hay and sprinkled the mixture on the hay, damping it down with water, then the di-calcic and salt clings to the hay. A small tin that will just hold 4ozs. can be used for measuring the mixture for each cow. The price of di-calcic is about 16s. 6d., salt 5s. per bag.'' (Secretary, T. A. Philps.)

SCOTT'S BOTTOM.

Mendelism.—Mr. Blakeley read the following paper:—''That children resemble their parents in some degree is a well-known fact. The physical and mental characteristics of some children are similar to those of their grand-parents and even great-grand-parents. The same may be said of animals and plants. Mendelism is the name given to the science of hereditary factors in plants; named after Gregor Mendel, Austrian abbot, and naturalist. From the time of Aristotle, the Greek Philosopher, who, three centuries before Christ, made a rough classification of animals and plants, to the 17th century when John Ray, an Englishman, made a beginning; very little was discovered in the science of natural history. In the 18th century, botany as an exact science began. Carol Von Linne, better known as Linnaeus, was the first great botanist who classified plants. He grouped the plants in different orders according to their sex organs, but hinted that his grouping was only provisional and elementary. When he died in 1778, England purchased his works which included 2,000 books, 14,000 plants and 7,000 specimens of shells, animals and insects. The Linnean Society was founded and named in honour of this great Swedish naturalist. The work that Linnaeus had started of bringing order out of confusion, and comparing species with species from all parts of the world, inspired the work of Charles Darwin who in 1895 submitted a paper to the Linnean Society, which caused a great controversy in the realms of natural science. Linnaeus, Sir Robert Owen, and other naturalists of the day believed that species never changed. Darwin, after years of study and collecting, showed that plants and animals respond to their environment. Gradually plants would change and the accumulation of differences would produce a new species. During this controversy Gregor Mendel was studying plants in his monastery garden at Brunn. In the world of science he was almost unknown. He observed the way in which plants handed on their qualities to their descendants. In 1869 he published his work and sent copies of it to the various learned societies in Europe. His work failed to win recognition, and Mendel became very bitter. He died in 1884 knowing that his work would open up a new field in science. Unfortunately Darwin never saw Mendel's work. Had these two great men met, each would have found the final solution of their life's study. In 1900 Mendel's

work was revived and his name given to the laws which he first discovered. His teachings are now accepted by men of science, and have been the means of producing new varieties of plants and fruit to enrich the staple food of mankind. Some of the experiments performed by Mendel were with sweet peas. He crossed a pure-bred tall sweet-pea with a dwarf sweet-pea. The offsprings were tall. He called this quality of the first generation dominant, and the quality of the parent, that is dwarfness, that it did not exhibit, recessive. When seeds of the first generation were planted they produce a certain number of dwarf plants, in the ratio of one quarter tall dominant and one quarter dwarf dominant. The other two quarters when planted reproduced both dwarf and tall. These experiments and laws were taken as a basis for improving plants. Mendel also proved that plants could reproduce from generation to generation without change. Thus the tendency to dwarfness or tall growing have their origin in the germ cells. He also discovered in the case of sweet peas and beans that the dwarf or tall tendency could be carried in the male element or female element of the plants, and it did not matter whether the pollen was transferred to the ovule or *vice versa*. The study of Mendelism has had far reaching results. The various wheats, roses and fruits that have been improved are too numerous to mention. Luther Burbank, the great American botanist, is perhaps the greatest of plant breeders. He improved wheat, walnuts, roses and plums. The patience and industry of the men of science working to benefit the man on the land and mankind in general is worthy of high comment. Without research, the man on the land would not advance far. Agricultural institutions where this is done often come in for adverse criticism, but it is a note-worthy fact that of all the new varieties of wheat produced in South Australia the majority and most successful have been Roseworthy bred.''

On May 26th, Mr. H. H. Orchard (District Instructor) delivered an address ''Potato Cultivation.''

Eight members attended the meeting held on June 23rd when a paper ''Ailments of Stock'' was read by Mr. Mitchell. (Secretary, E. Atkinson.)

1934 CALENDAR 1934

MAY

S	M	T	W	T	F	S
...	...	1	2	2	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	●	30	31	..	..
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	●	28	29	30
...	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	...	...	...	...	...	...
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	●	27	28
29	30	31	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	●
26	27	28	29	30	31	...
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
●	24	25	26	27	28	29
30	...	...	...	...	...	...

OCTOBER

S	M	T	W	T		S
...		2	3	4	5	6
7		9	10	11	12	13
14	15	16	17	18	19	20
21	22	●	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	●	22	23	24
25	26	27	28	29	30	...
...	...	...	...	...	...	...

DECEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	●	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying— Care of Milk and Cream Buttermaking Cheesemaking Pigs— Bacon Curing Beekeeping— Honey Horticulture— Vegetable Growing Flower Growing Poultry— Dressing Incubation Rearing Chicks Turkeys Ducks	Home Management— Furniture— Choice Repairing Needlework Knitting Rugmaking Clothing— Choice Repairing Dressmaking Pattern Afternoon Children— Care and Management Cooking— Recipes Recipes for Christmas Lunches Jam Making Fruit Preserving Fruit Drying Fruit, Value of Pickles and Sauces Sweet Making Exhibition of Home Crafts Christmas Gifts Home Nursing	Inter-Branch Visits Competitive Exhibition Flower Show Practical Demonstrations Social Music in the Home Good Reading Hobbies Physical Culture Labor Saving Hints Spring Cleaning Entertainment in the Home.

FORTY-FIFTH ANNUAL CONGRESS.

WOMEN'S BRANCHES.

The proceedings of the opening session are reported on pages 443-452 of this issue.

Attendances of Delegates.

The following branches appointed delegates, and the figures indicate the number of sessions for which attendances of delegates were recorded:—

Auburn—L. Dennison (4), W. Tansell (4). *Balumbah*—A. Ellis (5), H. Jericho (5). *Belalie*—N. Symonds (5), E. L. Orchard (5). *Clare*—J. Dux (5), F. Hicks (5). *Coonawarra*—W. Redman (4), V. Skinner (4). *Eurelia*—E. Hall (4), M. Daly (3). *Gladstone*—E. Pritchard (6), L. Sargent (6). *Goode*—A. Watson (0), D. Fagan (0). *Hope Forest and Dingabledinga*—A. Jeffries (6), L. Fincher (3). *Kalangadoo*—M. Brooks (5), R. Messenger (4). *Kangarilla*—R. Tester (4), C. Steer (2). *Kybybolite*—P. Heffernan (2), L. Cook (5). *Laura Bay*—D. Morrison (5), R. Blumson (5). *Mangalo*—M. Hannemann (5), A. J. Turner (5). *McLaren Flat*—J. Bruce (3), I. Nicolle (3). *Millicent*—K. Hutchesson (5), C. Oberlander (5). *Morchard*—E. Twigden (5), B. Mills (4). *Mundalla*—M. Fisher (5), M. A. Fisher (5). *Nelshaby*—A. M. Lawrie (2), I. Franks (5). *O'Loughlin*—C. Bergmann (4), E. Pfeiffer (5). *Parilla*—A. Weldon (4), L. Foale (4). *Parilla Well*—E. Ireland (4), A. Billing (4). *Parrakie*—J.

Halliday (4), E. Lahne (5). *Penola*—W. Mitchell (5), F. Kidman (5). *Pinnaroo*—C. R. Mattiske (5), S. Dowd (5). *Pygery*—M. Heath (5), G. Heylen (0). *Rendelsham*—F. Todd (4), P. Klem (5). *Saddleworth*—H. G. Coleman (6), P. Vogt (3). *Sheoak Log*—K. Koch (2), G. Everett (3). *Snowtown*—G. Freebairn (3), A. Dolling (5). *Tantanoola*—J. Telfer (4), Joyce Telfer (4). *Taplan*—P. Hodge (3). *Warcowie*—A. Avery (0), G. Hilder (4). *Warramboo*—L. Adams (5), D. Oswald (5). *Wasleys*—A. Wilson (5), J. Brown (2). *Wepowie*—H. Noske (4), T. Orrock (4). *Wilkawatt*—M. Thompson (3), A. Oram (5). *Williamstown*—G. Hammat (5), A. Cundy (4). *Wilmington*—L. J. Cole (5), J. Pengilly (6). *Wirrabara*—N. Keynes (5), G. Menz (0). *Wirrilla*—H. Jacka (4), W. Jones (3). *Yurgo*—J. Jarrett (5), M. Hopgood (6).

TUESDAY, OCTOBER 9th.

MORNING SESSION.

Delegates attended the Way Hall, and listened to an address, "Generalities Concerning Farm Poultry," by Mr. C. F. Anderson (Government Poultry Expert), after which they visited Mr. V. Gameau's poultry farm at Woodville.

AFTERNOON SESSION.

The Tuesday afternoon and following sessions were held in the A.N.A. Hall, Flinders Street, Adelaide,

Mrs. J. S. Hammatt, of the Williamstown Branch, was elected President, and Miss E. Lenihan, of the Department of Agriculture, acted as Secretary.

Mr. S. T. Gooden, Manager of the Wallpaper Department of Messrs. A. E. Clarkson Ltd., gave a talk, "Decorations for the Country Home."

LITERATURE IN THE HOME.

[MRS. N. M. KEYNES, Wirrabara.]

What pictures the words call up! One woman will look back on a time when books were brought from the school library and were began before her reluctant feet took her home, where the evening chores awaited the schoolgirl. Maybe another page or two could be snatched while the elders conversed after the evening meal, and if one was lucky a chapter or two before bedtime. Failing a library book, there were the books on the shelves read over and over again.

Another woman remembers a father who liked a thriller or a mother who loved romance. Then books came from the nearest circulating library, or they came from somewhere, for such people cannot live without books. The schoolgirl was not supposed to read these but, being the true daughter of these romantics, managed to get more than an inkling of their contents.

Perhaps the weekly paper was the only reading in which the family indulged. How it was conned from cover to cover! Another will not be able to remember a time when the little family did not group itself around an elder's knee, and their young minds drink in tales of enchantment.

Of all the privileges we enjoy there is none perhaps for which we ought to be more thankful than for books; to the real lover of them they are friends. In the narrow circle of our lives we cannot but seldom know the people we would—those inspiring people with whom we are at our best—but on the shelves the great minds wait patiently to give their treasures to whoever seeks them. Yet one sadly thinks how few people there are but who would think twice of spending the price of a joint of meat, or of an article of dress, fancied perhaps but not needed, or the price of an evening's entertainment, on a good book. Yet the book is a possession for life.

"But we must have food," we say, and "We must dress as other people dress." Yes, we must have food, and a great writer has said that "the sense of being well dressed gives a woman a feeling of tranquility which religion is powerless to bestow." I fear me that the man read us aright! Do let us reflect now and then that our minds are our real selves; do not let us starve these real selves, and lavish more than enough of food and clothes on the envelopes—our bodies.

The Home Library.

In building up a little home library, though tastes differ, what every household needs are reference books:—A dictionary to commence with, an encyclopaedia, a map or good atlas.

It is surprising how often even well-educated people misspell, and there can be nobody who does not need to look up a word now and then. But let us do more than that—a dictionary is the most interesting book. Let us study it now and then. Look for the meaning of words we are not familiar with; adventure with new ones; introduce them into our conversation.

There is a wealth of words to express every shade of meaning, yet how limited is our vocabulary! How we overwork a few adjectives; "nice," for instance; a nice woman, a nice cake, a nice dress, nice butter—all within five minutes!

Years ago a university student described everything that did not suit her as "rotten." Other words have come and gone since then; "putrid" and "poisonous" amonst them.

A cultured Indian whose English was a joy to hear was preparing for Oxford some Indian boys. He warned them of the ugliness of English speech, instancing the words "beast" and "beastly" as being common expressions. He told them they must set an example of purity in the English language when in England. These are among the people we give our pennies to help convert!

The Encyclopaedia.

An encyclopaedia on our shelves and a map on our walls, if in constant use, is a liberal education to a household, and even the boy whose interests seem centred in the doings of the cricket and football teams will follow on the map the flight of the aviator, the track of a ship, or maybe in response to father's request will finger his way to the site of the latest volcanic or political upheaval. Personally, if it were the only book or books that could be bought, I should buy an encyclopaedia, and depend on the circulating library for a time for other books.

Think of the satisfaction of being able to find an answer to most of the questions that crop up! Where does this or that come from; from what country and which part? Where is such a city or river? When and where did that man live, and what did he do to justify fame? If there is a student in the home an encyclopaedia is indispensable.

The following is a list of some of these books:—"Collins's New University Encyclopaedia with World Atlas," 1,376 pages in one volume, 9s. 6d.; "Routledge's Universal Encyclopaedia," 1,184 pages, 16 coloured maps, 3,110 illustrations, 11s. 3d.; "The Everyman's Encyclopaedia," strongly bound, printed on good paper, 12 volumes, £4 19s. 6d.; 1 folding map, 2s. 9d.; "Philip's League of Nations Handmap of the World," price 6d.; on rollers, small schoolroom map, 13s. 6d.; larger, 42in. x 52in., 24s.

There are other household reference books. If one is not satisfied with the gardening notes in the daily or weekly papers—which can be cut out and pasted in a blank book—no better book can be bought than Brunning's "Australian Gardener" at 7s. 6d. Cookery books almost every woman possesses. The cookery and domestic articles in the papers are so excellent that one cannot do better than preserve them. Never have we been so well served in this way.

If a member of the household is interested in any subject, be it bees or birds, flowers or trees, rocks or minerals, photography, machinery, drawing, or painting, let us not be satisfied until the book to help along the interest has been obtained. "Leach's Bird Book," for instance, costs but a few shillings. I have known someone who did not know more than one or two, and after a few years' observations and with the help of the book became familiar with the names and the habits of every bird seen in the district.

Some may like to refer to a book of etiquette, and being able to do so may save us mental anguish in unfamiliar situations, and it is reassuring to know how to begin and end some special letter.

A medical book should find a place on the shelves, not to rely on it as a substitute for a doctor when he is required, but often his services may be unnecessary, and on the other hand unsuspected dangers may be exposed. There are several good medical books, especially about babies—Truby King's being unsurpassed. The New Zealand women gave a beautifully bound copy to the Duchess of York when she visited that country.

People who have the care of animals should always have the best veterinary guides, especially where advice cannot be easily obtained.

Before dealing with general reading let me refer to those books written for children who are beginning to inquire from whence they have come It is a natural question from the child of four or five onwards, and if the parent evades the question, or tells the child lies, and later the child ceases to question we can be pretty sure someone else has answered it, and the child thinks there is something disgraceful about the business of coming into the world.

If the parent has difficulty in answering in a perfectly matter of fact way buy "The Cradle Ship," by Edith Howes, and read it, or if the child is able to read allow it to read the book, which has been strongly recommended. I have read it to young children in my case, and they absorb the knowledge as naturally as any other knowledge, and have not dwelt on the subject.

This course is the chief safeguard against the whispered, unpleasant story of some less fortunate child, who has not been told the truth. Edith Howes has also written some useful books for boys entering in their teens.

While on this subject it would be well to remember that there are papers which should never be taken into a home, especially where there are children—papers which depend for their circulation on the quantity of gutter news they print. Would we keep the garbage tin in the house? It would perhaps do less harm than some of the books and papers which find their way there.

Books for Girls.

Then, too, we must not let our girls be rushed into womanhood by reading trashy, sentimental novels. Few realise that such reading and the watching of prolonged love making on the screen is likely to hasten the young girl over the border which separates childhood and womanhood.

Psychologists say it is better to keep them children as long as is natural, and not let them be rushed into feelings they have not the wisdom or balance to control.

It is a particularly wholesome sign in a girl when she enjoys boy's books, and here, in passing, let us note that the average boy despises girls' books, and when he does read one it is usually accompanied by contemptuous snorts.

Some of you may have had the pleasure lately of listening in to a broadcast talk by the Director of Education. I saw the report in the "Advertiser." Mr. Adey said: "Every boy and girl should be encouraged to read real tales of adventure so long as these stories enshrined worthy ideals of conduct. There is still much to conquer in Australia, and the bold spirit of adventure is needed in every phase of national life. There is need for a literature that will fire the

youthful mind to leave the enervating city life and face dangers, and if it is to be produced the young people of to-day must master the secrets of great writers and in turn yield like treasures from their own minds." So it is for us to see that in these impressionable years that the right books to help our young people should be put in their way.

It is a significant fact that until the end of the 18th century, children were scarcely heard of in literature, and let us also remember that half of the children born died in infancy.

It would almost seem that Wordsworth was the Pied Piper who led the children into their kingdom:—

"Trailing clouds of glory do we come
From God, Who is our home;
Heaven lies about us in our infancy."

Then how quickly the English language was enriched! In many of the greatest books children were the leading characters. Dickens has a host of them:—Little Nell, Paul Dombey, David Copperfield, the fat boy, and many another; children who with George Elliot's Maggie and Tom Tullever and Bronte's Jane Eyre might almost be called the nation's children.

Do not let the children be shut out from this magic world until they can read for themselves. Let us remember the first seven years are the most important ones. Let simple Bible stories be a foundation, and here may be mentioned that Arthur Mee's "Bible for Children" is a precious possession for adults as well.

Such books as Kipling's "Just-so Stories," "The Wind in the Willows," "Alice in Wonderland," and that most beautiful of all children's books, "Hans Andersen's Stories"—Queen Alexandra's favourite book—can be enjoyed at five or at 50. Surely every girl would love "Little Women" and "Good Wives" and "What Katy Did"—books which have delighted four generations. There are Ethel Turner's earlier books, and Emily Montgomery, and a long list of school stories.

Books for Boys.

For the boy reaching out into life there is wealth indeed! "Robinson Crusoe," written 200 years ago, has delighted generation after generation. "Lorna Doone" they must not miss. "The Arabian Nights," Sir Walter Scott's books, Ballantine, Stevenson, Herbert Strang, Mark Twain. I can name but a few. All have written what is worth buying.

There is a delightful and instructive newspaper published by Arthur Mee. It is 17s. 6d per year, and an easier, more interesting way of putting the world's doings before these citizens-to-be cannot be found. Nearly every book mentioned can be bought well bound and typed in the "Collins Classics," at 2s. 6d.; "The World's Classics," at 3s.; "Everyman's Library," 3s.; "Nelson's Library," 2s. 3d.; "People's Library," 3s. Kipling's books are not in the cheaper editions.

To the young people in the upper classes of the Primary School with High School looming ahead, "Cassell's Book of Knowledge" is a gold mine, and will help them over many a hard place, as well as fill many an hour instructively. It is expensive bought new—about £8 for the eight large volumes. I know of one parent who put a 1s. advertisement in the "Wanted to Buy" column, and through it purchased an unused set for £3 10s.

Boys and girls, and the grown-ups as well, should read animal stories. Anyone who has read that beautiful book "Black Beauty" would not thoughtlessly turn out an old horse to die uncared for. "Owd Bob" is a powerful story of dogs and their shepherd masters, and the great love between them. "The Call of the Wild" and "White Fang," Jack London's earlier books; "Bambi," a story of deer and their terror of man, are some of the books that will help to remind us that here are God's creatures as well as ourselves—"little

brothers," the gentle St. Francis calls them. How important that children should be taught to be gentle, loving, and humane, and there is not a better way of doing this than by teaching them kindness to animals!

All the books, except one or two, are published in the cheaper editions, and when on a visit to town it is a good plan to inspect them and buy some. Depend on the circulating library if you like for the books of the hour which are the peculiar possession of the age, and for which we should be thankful, but if you are a reader buy the standard books. They are books with a soul—books that inspire, entertain, and satisfy. If they are to our hand we are more likely to read and re-read.

The worth-while books make us broader in our outlook, widen our sympathies, deepen our penetration, increase our reverence, and after years of this we find we are thinking for ourselves; that we have grown up; that our minds are no longer merely a cold storage plant for the thoughts of others, but a powerhouse for our own.

MORNING SESSION.

WEDNESDAY, OCTOBER 10th.

THE PLANNING OF A HOME.

An Address Delivered by Mr. Norman C. Fisher, A.R.I.B.A., A.R.A.I.A.,

In dealing with this subject, I readily appreciate the fact that my audience is drawn from the far corners of South Australia, and that the conditions under which many of you work and live probably vary considerably.

Time will not permit me to deal exhaustively with the subject, so that I ask that my remarks be regarded as a general outline only. Some of them may not apply to your own particular circumstances, others you may regard as being the obvious; but, nevertheless I trust that at least a little of what I say may be helpful to all of you.

The provision of shelter for man and his family is a problem which has confronted us since our ancestors swung themselves by their tails from tree to tree. Throughout the ages, however, the desire to improve one's conditions of living has exerted itself, until to-day the *planning, equipment and furnishing* of a home, whether it be small or large, country or suburban, is a subject which is very dear to the heart of the average woman.

In dealing with the question of home planning, let me make it quite clear at the outset that there are no golden rules, firm and immovable, that can and must be followed; rather we must regard each problem separately and on its own particular merits, with certain broad principles only, to aid us in our decisions.

The question of *site* is the first factor of major importance. You will readily appreciate that in the selection of a building site the owner is embarking on a project of no mean magnitude, and that it requires the very closest investigation into numbers of factors that will at some time or other affect the comfort of the occupants.

The suburban owner is faced with the possible development or otherwise of the district, for on that will depend the value of his investment. Women sometimes inquire into the social possibilities. Rates and taxes must be assessed, and travelling time and costs to and from business must be considered. Frequently these points are neglected, or else the attraction of the apparently cheap block proves to be too much for the prospective home builder, and he succumbs. Some of these factors fortunately do not bother you, but the fact remains that too many people conceive the plan of their home without any regard whatsoever to site or position.

No home should be planned until the position of the site and its relation to the points of the compass is determined, whether in the proverbial "40-acre paddock" or on a small allotment.

A flat site or one on a hillside present entirely different problems, the regular shaped site and the irregular still further problems, and then local conditions, such as winds, natural shade, protection by trees and hillsides, and the general configuration of the locality are all serious factors in the early deliberation on this subject.

The Aspect of a Home Should Determine the Disposition of the Various Departments.

Just as a modern factory is planned in relation to transport facilities, and the progressive processes of manufacture and distribution, so can the departments of a home be allocated in a similar manner.

The average home consists of living, sleeping and working quarters. Their nature and position should be determined by the personal likes and dislikes of the owner, by the particular habits of the home, and by the degree of assistance rendered by servants, whether manual or mechanical.

Let us then consider the functions of the various dispositions of our plan:—

The housewife probably regards the commissariat department as the most important of the house. Under this heading we include food reception, storage, preparation and service.

In South Australia the usual custom is to serve a hot dinner in the evening. This means that the greater portion of the preparation of this meal is done in the afternoon. As the kitchen is at the best of times the warmest room in the house, it reasonably follows that every provision should be made for keeping it naturally cool at that period when it is most continuously used. Generally speaking, the summer planning of this room should receive primary consideration.

The usual summer afternoon breezes are easterly; therefore, if possible, the kitchen should be in such a position on the southerly or cool side of the house, to take advantage of cooling breezes during the hot period.

Bedrooms should not, in my opinion, be placed on the southerly side. For the greater portion of the year it is impossible for the sun to enter these rooms, and if they are utilised as sleeping rooms, and not merely dressing rooms, this is a distinct disadvantage.

An easterly aspect for bedrooms is good. The early morning sun can at least enter the room and lend a genial air sufficient to enable early risers to do so with some degree of willingness, and are sufficiently protected from the general heat of the day to render them comfortably cool enough when it is time to retire.

The position of a sleep-out, however, provides a good deal of discussion and differences of opinion. Used chiefly as summer sleeping quarters, consideration is due to obtaining the maximum benefit from whatever cooling breezes there may be. In the eastern suburbs of Adelaide the much-abused gully winds have certain virtues, in so far that they do provide quick cooling, whilst at the seaside and other situations the prevailing evening breezes are frequently south-westerly. Generally speaking, the south-westerly situation is one which affords the most general satisfaction in the use of a sleep-out.

The Functions of Rooms.

The preference of people to regard the dining room solely as a mealing room renders the need for this to be planned as a large room quite unnecessary.

The living room has become a common feature of the average home, and if the purse be sufficiently deep, used in conjunction with a smaller and cosy den, or smoke-room. The formal drawing room is an additional luxury if it can be afforded.

Working quarters, consisting of kitchen, pantry or store, perhaps a cellar or cool room, scullery, and servery should receive very careful consideration.

With sufficient thought in respect to the proper size and disposition of the most used sections of this department, the energy of those responsible for its proper working can be very considerably conserved. I am a firm believer in the long narrow-shaped kitchen, in which the progressive processes of food preparation, cooking and service to the mealing room can be carried out with a minimum of tramping across a wide room.

Great credit must be given to the Americans for their endeavours to bring the kitchen to a very high state of efficient planning and operation.

We, as good Australians, sometimes unduly flatter ourselves as to the general excellence of the climate that we enjoy. Undoubtedly we have one of the most temperate climates in the world; but are we not unwise, unless we plan to intelligently provide against the excesses of heat and cold which are sometimes inflicted on us? To disregard these two factors is to submit to extremely uncomfortable and unnecessary conditions. In regard to the heat, the use of verandahs, porches, loggias, and similar types of protection is admitted as being wise and very necessary. There are limits to their uses and advantages, however. I believe that they are often needlessly employed, particularly on the southern side, where they rob the rooms adjacent, not only of their cheerfulness, but also to a degree of their healthfulness.

One readily admits that other considerations such as the careful conservation of roof waters affects one's judgment in these matters, and the broad expanses of roof and verandah are very often necessarily so regarded as being a first consideration, particularly in dry districts.

Shade and Coolness.

Consideration should be given to the judicious planting and placing of suitable trees, not only as break-winds, but as the creators of shade and coolness, for in many circumstances this method is equally efficient and certainly less costly than many of the heavy verandahs erected.

The keeping of a house cool is certainly a complex question. The very general use of iron in South Australia, used in conjunction with other materials, is one of the chief factors against cool houses.

One of the greatest weaknesses in home building is the lack of care exercised in preventing the radiation of heat from roofs to ceilings. The old-fashioned lath and plaster ceilings, with all their faults, were certainly much better insulators than some of their successors, and with the use of comparatively thin sheet ceilings of to-day the use of some definite insulation is not only desirable but almost imperative.

One cannot help regarding the apparent indifference displayed in respect to so important a feature as this as being unnecessarily stoical.

The question of *cool homes* can be summed up in the following:—

Thick walls are excellent protection against the direct rays of the sun.

Ceilings should be lined with materials that insulate; or, failing that, have them packed with some suitable insulating material.

In the case of framed walls, line internally with a material with definite insulation value, or pack the framed walls with some insulating material.

Provide sufficient verandahs, porches and trees to protect the home from excessive direct heat.

Keep the sun off windows by means of external blinds or shutters.

Provide a sufficiency of well-placed windows to take advantage of cooling breezes or cool changes.

In respect to cold conditions, we do have some particularly cold weather, felt perhaps more because of the large difference in the extremes of summer and winter temperatures. We do not, however, suffer from the winters, for instance, experienced in Canada, where practically every household, however modest, regards some form of central heating as an integral part of the home.

Our conditions are such that in planning a home provision should be made for the general comfort of the household in the cold months of the year.

General Home Equipment.

The rapid growth of all forms of electrical aids to housekeeping has been most marked.

Let us hope that the day is not far distant when, by some means or other, the facilities enjoyed by town folk will be extended, so that it will be possible for you too to avail yourselves of their advantages.

Hot water services are one of the greatest assets to a well-run home. These can be provided to work with oil, coke, gas and electricity.

Water softeners render the housewife independent of the rain-water supply.

Household refrigeration is as great an advance on the ice-box as that very valuable acquisition is on the drip-safe.

The modern kitchen, equipped with its elevated stove, rustless steel or aluminium sink and drainer, well-planned and adequate cupboards, properly ventilated, is undoubtedly a joy to the housewife. Speaking of cupboards, let me impress on you the value, not only from the point of view of appearance but of efficiency, of cupboards fitted with doors having flush enamelled surfaces without mouldings of any kind. In place of shelving of solid wood cupboards for use as food storage can now be equipped with shelves of tinned wire mesh, easily removable and easily cleaned. The provision of a small alcove situated in or near the kitchen for mealing purposes is also a great asset.

In conclusion, let us give consideration to the house of the future, a little thought on which provides a most interesting study.

The advance of modern building science has been so rapid that one can look with confidence to the fact that great improvements and considerable change will take place in our homes, our methods, and our lives generally. Even to-day homes are being built entirely insulated from and unaffected by the heat or cold of the outside atmosphere. The whole of the air contained inside the home and breathed by the occupants can be washed, filtered free of all dust and germs, and its temperature controlled to any degree by a simple adjustment in any particular room.

Windows are being used for the admission of light only, and are being glazed with special glass, permitting the access of the valuable ultra-violet rays, otherwise cut off from persons inside a building.

Buildings are also being insulated against all forms of outside noises—a particularly necessary feature of apartment life in crowded and noisy areas.

These particular innovations are actual fact; although not common practice in Australia they are frequently availed of in the great cities of the world.

CONFERENCE OF WOMEN'S BRANCHES AT PINNAROO.

Mrs. J. Johnson presided over an excellent attendance of delegates from the Pinnaroo, Wilkawatt, Parrakie, and Parilla Well Branches at the Conference which was held under the auspices of the Parilla Well Branch, at Pinnaroo, on September 18th.

Mr. A. J. A. Koch (member of the Advisory Board), in the course of the opening address, expressed pleasure at seeing such a large attendance, which was evidence, he said, of the interest shown in the Women's Branches of the Bureau in the mallee areas.

No less than the farmers themselves, the womenfolk of the country were doing their share in steering the farm through these difficult days. Twenty-five to thirty years ago the town they now knew as Pinnaroo was only a maze of mallee scrub. To-day the country served by the railway from Tailem Bend to Pinnaroo carried 800 farmers and their families—wonderful progress in such a comparatively short space of time, and equally with the farmer, his wife had played her part in the pioneering stages of the settlement of the mallee. He congratulated the ladies on the wide range of subjects that they would discuss at their Conference, and felt sure that all would feel that the Conference had proved interesting and instructive.

It was resolved:—"That members of Women's Branches represented at the Conference do some form of charitable work to be forwarded to any desired institution."

To boil a ham that has become dry Mrs. Young, of the Pinnaroo Branch, advised that it should be first soaked in plenty of water for 24 hours, then placed in a boiler of fresh water, and boiled quickly without lifting the lid for 20 minutes or longer, according to the size of the ham. If large it should be left for three-quarters of an hour, or if exceptionally large one hour. Prepare plenty of bags, and place two in a washing trough or tub, put boiler on these, and then cover well with bags or old woollens, and leave until the following morning; the steam cooks the ham, and makes it soft and tender.

Delegates attended a combined meeting of the Men's Branches at which Mr. C. F. Anderson (Poultry Expert) delivered an address, "Poultry Keeping in the Mallee."

Miss E. Campbell, of the Education Department, spoke on the care and food value of milk.

Mrs. F. Atze, Pinnaroo, gave a demonstration of making a floral design, and the following papers were read and discussed:—

THE PIE MELON AND ITS USES.

[Miss Colwill, Parilla.]

Although the melon is not so valuable as most fruits, and does not compare with the peach, pear, and the apple as regards palatability, yet it has many things in its favour, and stands alone in its many uses for adding to other fruits.

The melon finds its favour in being insipid and tasteless. In these days when we all want to make everything go its furthest the melon again comes to our assistance in making jam, pickles and chutney, and making into pies. It is quite profitable to use the melon with other fruits without affecting the flavour of the desired fruit.

The melon, being tasteless, does not extract from the stronger flavoured fruits. When making jam or jelly, use when possible, the red-seeded melon; it is much better than other varieties. To have jam nice and clear and to set well, a good, fresh firm melon is best. Mostly when a melon of a few months' standing is used it becomes soft, and often is spongy in the centre. The jam then takes much longer to boil, and is tough, and generally has a cloudy appearance.

Cultivation.

The cultivation of all melons is similar. An open, exposed, warm situation should be chosen, deeply dug and well manured soil, and an ample supply of water during the time they are growing. They can be grown in any garden soil, but favour a light, rich sandy soil. Prior to planting, dig a hole 4ft. or 5ft. square and 18in. deep; mix the soil taken out with well-rotted manure, and return to the hole. Leave the surface in the shape of a saucer, so that it will retain the water applied to it. Sow the seeds directly into the ground; transplanted plants seldom grow. Plant several seeds in the hole, about 1in. below the surface, and cover with light soil. Quite probably, more seeds will germinate than are required. If so, pull up the weaker plants, leaving two or three to mature.

When the plants have made three or four leaves, hoe the ground and mulch it with manure, keeping it moist in the early stages of the plants, increasing the water as the plant develops. If particularly fine fruit is wanted, give liquid manure once a week. When the vine has made sufficient growth to cover the ground peg the runners down every yard or two to prevent the plant from becoming misplaced and spoilt through the wind blowing the runners about. This also helps in keeping the ground moist, because the runners are kept in place and the ground is shaded. Stop the main shoots at the fourth or fifth joint above the fruit to promote growth of the lateral branches. If the fruits are raised it prevents them from suffering through being on the damp ground. Keep the plants well watered while growing, otherwise the fruit will not be a success.

When the fruit begins to ripen, cut off the water supply, for little or none is then required. Sun and air will ripen the well-developed melon. When the foot stalk cracks away from the fruit it is then ready to cut, and if carefully packed away, will remain good for months. The melon—apart from its uses at this time of the year—provides abundance of green in the garden that would probably be dry soil, always giving a cool, refreshing appearance. Apart from the pie melon, the water melon, rock melon, and sweet melon are very useful. Most people grow them for their fine flavour. They make a very tempting and delicious dessert. Their light colours are very attractive.

Pie Melon Recipes.

1. *Melon and Lemon.*—6lbs. melon, 7lbs. sugar, 6 lemons, ¼lb. preserved ginger, 1½ teaspoons ground ginger, 1 teaspoon tartaric acid, 10 cups water. Method—Cut

melon and lemon into small pieces, add water and 2 cups of sugar. Stand all night; next day boil ¼ of an hour. Add other ingredients, and boil for 1½ hours, or longer if necessary.

2. *Melon and Orange.*—6lbs. melon, 6 oranges, 4lbs. sugar. Method—Cut melon into small dices and oranges into thin slices. Stand over-night; next day boil a few minutes; then add sugar. Boil until clear, and a little will set in a saucer when tested.

3. *Melon, Lemon and Orange.*—2lbs. melon, 2 oranges, 6 lemons, 4lbs. sugar, 7 cups water. Method—Cut melon into small dices, cut orange and lemon very fine; boil all without sugar for ½ an hour; add sugar, and boil about 1¼ hours.

4. *Melon and Passion Fruit.*—8lbs. melon cut into small squares, 6lbs. sugar, juice of 3 large lemons. Let sugar and melon stand over-night; next day add lemon juice; boil about 2 hours, or until melon is soft and clean. When nearly done add the juice of 18 passion fruit. When jam is done, take off the fire, stand for ¼ of an hour; then add the passion fruit seeds, stirring them well in. If the seeds are boiled in the jam they become hard and black.

5. *Melon and Pineapple.*—These make a good combination, allowing equal quantities of each fruit, and ¾lb. sugar to every pound of fruit (mixed). Method—Cut melon into squares, boil until tender, just sufficient water to cover them. When soft add the peeled pineapple, which has been minced, boil a few minutes; add sugar; boil fast for ¾ of an hour, or until fruits set when tested.

6. *Melon and Blackberry.*—Allow ½lb. blackberries to each 1lb. of melon, and ¾lb. sugar to each 1lb. of mixed fruit. Cut melon into small pieces, put fruit into pan with 1 cup of water to each 4lbs. of fruit. Simmer until soft, then rub through a sieve. Return pulp into pan with sugar; when the latter has dissolved boil fast for ¾ of an hour. Grated rind and juice of 1 lemon to every 3lbs. of fruit may be added. Blackberry jam may be added to melon if fresh blackberries are not obtainable, and make a very nice jam.

7. *Mock Ginger.*—1gall. of water over ¾lb. of lime; let stand until clear; strain through muslin. Method—Cut 12lbs. melon into small pieces, pour on lime water, and stand over-night; drain, and put into preserving pan. Add 1gall. of fresh water, 12lbs. sugar, 2lbs. preserved ginger, ½oz. citric acid, ½lb. whole ginger (bruised); boil gently for 6 hours.

8. *Melon and Quince.*—Cut 18lbs. melon into squares, 15lbs. quinces; cut into slices; and 21lbs. sugar. It is not necessary to peel quinces. Let melon and quinces stand over-night; add part of the sugar; next day boil for about ½ an hour. Add remainder of sugar; boil until a nice red colour, and will set when tested.

9. *Melon and Dried Apricot.*—6lbs. melon, 2lbs. dried apricots, 4½lbs. sugar. Method—Cut melon into small squares. Let stand over-night with sugar. Soak apricots in water (sufficient to cover them). Next day boil all together until melon is soft and clear. The jam will have the appearance of apricot jam.

10. *Melon and Raspberry.*—2lbs. melon, 3 lemons, 8 cups water, 7lbs. sugar, 1 tin raspberry jam. Method—Cut melon into small pieces, cut lemon thinly, add water and stand over-night. Next day boil until melon appears transparent; add sugar and berry jam, and boil until mixture will set.

11. *Melon Jelly.*—Cut 8lbs. melon into small pieces, leaving in the seeds and rind on; add 1½lbs. sugar, and stand all night. In another vessel cut 7 fresh lemons very fine; cover with 6 pints of cold water; stand all night. Next day mix together, and boil until soft; strain through cheese cloth, and to every pint of juice add 1lb. sugar. Boil gently for 2 hours.

12. *Melon Tart.*—Boil the melon until quite soft, then turn into a colander to drain. Add sugar to taste (this makes ample juice for the tart); add a pinch of citric or tartaric acid. Other flavouring for melon tarts which make a nice change when added to the cooked melon are the juice of a large lemon, ½doz. passion fruit,

or ½ cup of raspberry jam. Any one of these will take the insipid taste from the melon. Line a plate with a thin layer of pastry; add melon mixture and a thin layer of pastry on top. Bake in a fairly quick oven.

13. *Melon Chutney.*—Melon is excellent for chutney or pickles. 9lb. melon, 2½lbs. seeded raisins, 1lb. currants, 3ozs. garlic, 6ozs. dried ginger, 2½lbs. sugar, 3 dessertspoons chillies, ¼lb. salt, 4 quarts vinegar, ½ cup honey. Put the fruit and vegetables through the mincer; add other ingredients, and simmer until soft and thick.

14. *Melon Chutney.*—5lbs. melon, 3 large onions, 4 cups sugar, 4lbs. apples, ¼lb. bruised whole ginger, ¼ teaspoon cayenne pepper, 1 tablespoon each salt, cloves, and peppercorns, 1 teaspoon mixed spice, 3 pints vinegar. Method—Cut melon and onion into small pieces; put into preserving pan with cold water to cover; boil 10 minutes; strain off water; return vegetables to the pan with other ingredients; tie ginger in a muslin bag; boil apple before adding to other ingredients; boil all together for 1 hour, or until a desired consistency; bottle, and cork securely when cold.

15. *Melon Pickle.*—10lbs. melon, free from skin and seeds, 6 large onions. Cut into small pieces, put into bowl, sprinkle with salt; let stand over-night. In the morning strain off the brine through a colander, and add 4 pints vinegar, 1 cup each sugar and golden syrup, 1 teaspoon cayenne pepper, 1 tablespoon peppercorns tied in a bag, 1 dessertspoon tumeric, 1 teaspoon curry powder mixed with a little vinegar. Boil together for 10 minutes, then add the drained melon and onion, and boil until tender; then thicken with 1 tablespoon mustard, mixed with a little cold vinegar and 2 tablespoons flour. Add to the mixture, and boil for a few minutes.

MARKETING OF EGGS.

[Mrs. E. C. SLATER, Parilla Well.]

The time has come when eggs must be sent to market in the most attractive way. First of all, eggs must be perfectly fresh. An egg with an air-cell larger than sixpence is classed as stale, and would not be passed as fit for export. Eggs must be clean, and of a good shape. Dirty eggs and eggs of a bad shape are classed as rejects. In cool weather eggs must be gathered once a day; in hot weather three times. In hot weather I gather the eggs about 10 a.m., 2 p.m., and at feeding time, about 5 p.m. As a rule, very few hens lay after about 2 p.m. Before putting eggs away is the best time to stamp them, also to clean any that need it. To clean the eggs, hold the egg in the left hand with a dry rag, and use the damp rag with the right hand. Be careful not to shake the egg, or the air cell may be fractured. For some companies the eggs have to be graded. Eggs are packed and graded in layers of 2ozs. and over 1¾ozs., 1¾ozs., and underweights. This may seem a lot of trouble, but one soon becomes used to it, and it is satisfactory to know that the eggs sent to market are fit for export.

EARLY MORNING BREAKFASTS.

[Mrs. M. S. DAVIS, Parilla Well.]

Breakfast is always a problem, for it must be a quickly-prepared meal, as well as provide a good start for the day. First and foremost, the fire must be set the night before. This saves time in lighting, and the wood is well dried by the warmth of the stove before morning, thus giving the fire the best possible chance to burn. Secondly, it is not any trouble for the menfolk to put a match to it, and by the time the housewife is dressed the kettles are almost boiling.

We want to make as much variety as possible in our breakfasts, without taking up too much time. We must first decide what constitutes an ideal breakfast dish. A good breakfast dish is one that can be cooked quickly, or a cold stand-by that

has been prepared beforehand. The usual breakfast favourites, such as eggs cooked in different ways, bacon with fried bread, tomatoes, sausages, kidneys, or liver come under the heading of things that can be cooked quickly; while a cold stand-by may be one such as cold boiled ham, brawn, or any other cold joint. Breakfast also provides an excellent opportunity for using up odds and ends from the day before, and so preventing waste without letting the family realise that you are using up cold food that is left over.

All breakfasts mostly start with some cereal, such as semolina, oatmeal, wholemeal, crispies, &c., served with milk and sugar. Although the solid part of the breakfast may differ considerably, most people drink tea or coffee. Good coffee is as easy to make as tea, if one uses enough of it and never allows it to boil; this gives it a bitter taste. This recipe for making coffee is very simple and good:—To each person allow 1 dessertspoon of good coffee grounds and ½ a pint of boiling water. Heat a jug and put in the coffee, pour on quickly the required amount of boiling water, cover with saucer or lid, and stand it where it will keep hot. Leave for 5 minutes, then stir with wooden spoon, and stand another 5 minutes. Strain well, and serve with hot milk. The secret of success is to keep the jug of coffee hot all the time without letting it boil.

Some Breakfast Hints.

If bacon is salt, put in frying pan, cover with cold water, and bring to the boil; then pour away the water and fry the bacon in its own fat, if possible. Bacon is nicer if cooked quickly. Fried sliced apples are good with bacon for a change.

Toast should be made quickly or it will be tough—not crisp, as it should be. When made, it should stand upright to allow the steam to escape, and thus prevent it becoming sodden. If one has many slices to toast, place slices of bread in the stove, and they are then warm and toast more quickly.

Sausages should not be fried too quickly, or they will break. If sausages are too rich fried they are very nice boiled for 10 minutes in water.

Kidneys make a nice breakfast dish, but should not be allowed to curl. To prevent this, split open each kidney after removing the skin, stick a skewer through the opened kidney to keep it flat, and quickly fry in a little fat, cooking the cut side first. Serve underdone rather than overdone.

Scrambled eggs on toast are a favourite dish. Here is a tasty variation:—First melt 1 tablespoon of butter in the frying pan, then put in a little cold vegetable, or some chopped meat or ham. Beat the whites of the eggs first, then stir in the yolk with 1 tablespoon of warm water to each egg, salt and pepper to taste. Pour the eggs quickly on to the vegetables or meat that have been heated in the butter, keep turning it over with a knife for a few minutes until it is just set, not hard or tough.

As a change from the old way of having bacon and egg served together on a plate, spread a thick piece of toast or fried bread with chopped-up bacon or ham, then lay a poached or fried egg on top; sprinkle with grated cheese, if liked.

We then have the using of cold vegetables—"bubble and squeak." Bubble and squeak is made of left-over cold potatoes, cabbage, or any other vegetables. Heat a very little butter or fat in the frying pan, and put the cold vegetables in, and keep well stirred and mashed together until heated. Cold meat can be made to go a long way by cutting into thin pieces and dipping in a batter made of 1 cup self-raising flour, pepper and salt, and mixed with cold water. A little chopped parsley is an improvement. Make the same consistency as for pancakes. Dip pieces in the batter and fry in hot fat, not too quickly, but hot enough to brown them. These, eaten with sauce or an egg or bubble and squeak, are very nice.

Chops are very tasty for breakfast. They are made extra nice by beating up an egg, dipping them in it, and then rolling them in breadcrumbs. This could be done the night before, thus saving time in the morning. It is a good idea to put any left-over scraps of bread from the table in the stove to dry and then roll them. Kept in a jar or tin, they are always ready when needed.

Gravy is very important with a fry. To make good gravy, first drain fat from frying pan, leaving about 2 tablespoons of the fat in it; put this on the fire and then sprinkle in about the same amount of flour through the sifter. It is very important to sprinkle flour with sifter as it spreads evenly. Let it brown and cook well, but not burn. Have ready a cup of cold water, and as soon as taken off the fire stir in the cold water. Mix well in order not to leave any lumps, then add some hot water. Put back on the fire, season, and boil for a few minutes.

Lamb's fry is practically the quickest breakfast dish to fry, but if done this way will always be tender. Slice liver thinly, flat way of liver, thus giving nice large pieces; dip in plain flour, sprinkle with pepper and salt, and fry in hot fat just enough to brown, but fry quickly, then turn and fry the other side. Take from pan and put in a small saucepan. Make gravy and pour over liver, place the lid on and put in on the side of the stove to simmer for a few minutes. This makes it very nice indeed and very tender.

There are many dishes suitable for breakfast, and many small jobs which may be done the evening before that help considerably in getting the breakfast quickly—filling kettles, laying the cloth and putting down dishes and cutlery, cutting chops, bacon or liver, &c., but the main thing is to know the evening before what is for breakfast.

BISCUITS—PLAIN AND FANCY.

[MISS KATHLEEN SIMPSON, Parilla Well.]

Short Biscuits.—1 cup good dripping, 1 tablespoon vinegar, 2 cups sugar, 2 eggs, 1 sifterful flour, ½ teaspoon salt, 2 teaspoons cream tartar, 1 teaspoon soda, ½ cup milk (a little more if needed). Method—Melt dripping with vinegar, beat sugar with egg yolks, whip the white stiff, add milk and a few drops of essence, then flour sifted with salt, &c. Divide dough into three parts. With floured hands roll one part on baking board in a long roll. Take a sharp knife, dip in flour and cut roll into ¼in. slices. Place on greased slide and bake a nice brown. These biscuits can be iced and decorated or eaten plain.

Chocolate Cream Sandwich Biscuits.—7ozs. plain flour, 2 tablespoons each cornflour and icing sugar, ¼lb. butter, 2 tablespoons cocoa. Method—Beat butter until creamy, add sugar and beat well. Then beat in cornflour, and lastly stir in sifted flour. These biscuits should be put through a forcer.

Chocolate Filling.—2 tablespoons each butter, sugar and grated chocolate or cocoa. Beat until creamy. Allow to cool and firm before using.

Raspberry Cream Sandwich Biscuits.—Method—Make in same way as chocolate creams, but omit chocolate or cocoa in the biscuit mixture. Use raspberry cream filling made by beating 2 tablespoons of butter, 4 tablespoons icing sugar, and 1 tablespoon raspberry jam. Allow this mixture to cool and firm before using.

Forcer Biscuits.—1 cup each butter and sugar, 2½ cups flour, 2 eggs, 1 tablespoon each ground rice and maizena, 1 teaspoon cream tartar, ½ teaspoon carbonate soda. Method—Beat butter and sugar, add eggs (well beaten), then dry ingredients. Put into forcer and make into shapes as desired. Bake in a moderate oven.

Rosala Biscuits.—2 cups self-raising flour, ½ cup sugar, ¼lb. butter, 1 egg, icing sugar. Method—Mix all dry ingredients stiff with yolk of egg and little milk. Roll out very thin. Beat white to a stiff froth, then add icing sugar to make a firm paste. Spread over dough, sprinkle with cocoanut. Cut in fingers; bake 15 minutes.

Rolled Oat Biscuits.—¼lb. butter, 1 cup sugar, 3 cups rolled oats, 1 egg, 1 dessertspoon golden syrup, 1 teaspoon cream tartar, ½ teaspoon carbonate soda. Method—Melt butter, beat eggs and sugar together, then add butter, golden syrup, rising and oats. The mixture seems a bit dry, but it does not need any more moisture.

Put in little heaps on a greased tray. When cooked leave on tray for a few seconds to harden. If left too long they break up; in that case just warm them again.

Ginger Nuts.—1lb. flour, ½lb. treacle, ¼lb. dripping, 3ozs. sugar, 2 tablespoons milk, 1 teaspoon carbonate soda, 2 teaspoons ginger, 1 teaspoon mixed spice, and pinch of salt. Method—Melt treacle, dripping and sugar together, add milk and dry ingredients; knead well. Bake in a moderate oven.

Italian Biscuits.—1lb. flour, ½lb. each butter and sugar, 1 teaspoon nutmeg, 2 teaspoons cinnamon, ½ teaspoon carbonate soda, 1 teaspoon cream tartar, ½ cup milk. Method—Mix well together, roll out thin, bake in a brisk oven. Stick two together with raspberry jam. If wanted ornamental, put a tiny bit of icing on each.

Sao Biscuits.—Rub 2 large tablespoons butter into 2 cups plain flour with 1 teaspoon salt. Mix to a very stiff dough with milk. Roll out as thin as possible; cut into shapes, and prick with a fork. Bake in a very hot oven for a few minutes until slightly brown and crisp. They are nice with buttermilk instead of milk.

Cocoanut Biscuits.—Mix together 4ozs. flour and cornflour. Rub into this 3ozs. butter. Add 4ozs. castor sugar, 3ozs. desiccated cocoanut and 1 teaspoon baking powder. Mix with 2 eggs, roll out, cut into shapes with a fancy cutter, and bake in a moderate oven.

Jew's Biscuits.—1lb. flour, ½lb. each butter and sugar, 2 eggs, 1 teaspoon cream tartar, and ½ teaspoon carbonate soda. Roll out on tray, polish over with egg, and sprinkle on sugar and cinnamon and sliced almonds. Cut into squares.

Finger Biscuits.—Cream ¼lb. butter with 2ozs. sugar, add the yolk of egg and 1 tablespoon water (beaten together first), add ½lb. self-raising flour (or plain flour and 1 big teaspoon baking powder); blend into stiff lump, and roll out thin on floured board. *Icing.*—5 large tablespoons rolled icing sugar, 1 white of egg, 3 tablespoons cocoanut. Cut biscuits into fingers, spread with icing mixture, and sprinkle with cocoanut or chopped almonds. Bake about 15 minutes in moderate oven.

BALHANNAH.

July 17th.—Attendance, 19.

Gardening.—Mrs. Botroff read the following paper:—"An ornamental garden should be divided into walks, lawns, rockeries, and beds. Individuality can be expressed in a garden and the house and surroundings should reflect the tastes of the owner. In laying out a garden, natural features should be taken advantage of as much as possible. Where there is a good view or outlook, an opening should be left so that it is not obscured. Undesirable surrundings can be hidden by a trellis, hedge, or trees or a bush house. Irregularities in the ground can be taken advantage of to introduce a few steps and curves in the paths. Banks can be grassed and planted with bulbs, or they may be covered with some Wichuriana roses, which delight in such situations. These roses are also excellent coverings for old tree tumps and roots. Arches for roses can be easily made of rough timber; if planted with some of the more vigorous climbing varieties, they are soon covered, and form a delightful feature in a garden. There are various creepers that can be grown over frameworks, to form nice shady walks. The provision of breakwinds for sheltering the flower garden from cold or hot winds is important. Plants will not thrive without adequate protection. Another method is to plant hedges and trees, but they rob the ground of moisture and nutriment. For raising seedlings, shallow boxes make a very good substitute; these should have a number of holes drilled in the sides and bottoms, and be a quarter filled with crocks, charcoal, or other good drainage material. Only about 3in. or 4in. of surface soil is necessary. A good soil for sowing seeds in consists of equal parts of sandy loam and leaf mould, with a mixture of rough water-washed sand. In preparing the soil, press it firmly, then sift fine soil on the top and make it quite even, and give a good watering some hours before sowing the seed. If the seeds are very small no covering will be required; just press them equally with a flat piece of board into the damp soil. If the soil has been properly soaked previous to sowing, probably no water will be required until the seeds germinate, but as soon as the soil shows signs of drying, it should be watered with a very fine spray, so that the surface will not be disturbed and the seeds washed away. Some seedlings are hardier than others. It is advisable to make a couple of sowings of each packet, with a week's interval; the second sowing often proves a success when the first has failed. Heavy rains do a lot of damage to young seeds. Light wooden frames covered with wire-netting, over which hessian or cotton shading is stretched, is a great help; whatever shade is used should obstruct as little light and air as possible. Choose a moist, calm, dull day for planting out seedlings. The soil should be damp and the holes not opened until the plants are ready to go in the ground.

Vegetable Gardening.—The best soil is a deep light, friable loam, but any ordinary soil can be made into a good garden with care and attention. One of the main things is to keep the ground free from weeds. The hoe should be kept at work to kill the weeds and maintain a loose surface. Very light soils are best manured with cow manure; horse manure is best for heavier soils. Unless the ground is very sandy and naturally drained it is advisable to artificially drain a garden. In ordinary digging thoroughly turn the soil over and except in very shallow soils the spade should be used to its full depth. Keep a small trench open when digging and all surface weeds can be put into this and buried. Excellent long-lasting manures can be used in conjunction with wood ashes and well-rotted stable manure. They contain little or no potash, and as this element is deficient in most soils, a dressing of some other manure containing potash is adviable. All seeds do not take the same time to germinate, nor grow with equal strength. In light, dry soil fairly deep sowing is advisable, while in heavier soils and cooler situations shallow sowings are preferable. Such large seeds as Peas and Beans may be sown from 1in. to 2ins. deep. Beet, Cucumbers, Melons, Pumpkins, and Marrows ½in. to 1in.; while the smaller seeds which do not require transplanting should always be planted in rows, so that they can be easily weeded and cultivated. Transplanting should be done in moist, cloudy weather. Give the seed-bed a good soaking, then lift the plants with as much soil as possible, taking care not to damage the roots. They should then be planted in rows the same depth as they grew in the seed-bed—using a pointed stick to make the holes—then firmly press the soil around the roots. Water them well, and if the weather is very hot provide shade. Use a line for planting the garden, so that the rows will be straight. Water Melons and Pie Melons should not be planted anywhere near each other, because of the danger of cross-fertilisation. The best way to grow Pumpkins, &c., is not to plant until the spring is advanced; the seeds will not germinate in cold ground. Have the soil well manured, and plant the seeds about 2ft. apart in rows, and when big enough bank up the earth about 3ft. each side away from the pumpkins so that when watering the water will not waste. They need plenty of water and some liquid manure." (Secretary, Miss D. Spoehr.)

MILLICENT (Average annual rainfall, 29.76in.).
June 15th.—Attendance, 10.

GARDENING HINTS (*Mrs. Bryant*).—"Gardening is an interesting and healthy occupation for either man or woman. The soil must be well worked and weeds kept down, digging in occasionally some lime and later manure—do not use both together. Lime is a splendid vermin destroyer. Sandy soils require more manure than heavy soil. After planting out rows of either vegetable or flower seedlings keep the soil loose between the rows. Chrysanthemums do well in sandy soil with old stable manure dug in and allowed to remain some time before planting. Plant out one root with one stem in August about 3ft. apart, and by November top them to keep the growth down. Put down stakes to tie them to—they are very brittle and break easily. If large blooms are wanted bud them as soon as the buds show up, leaving one bud on each strong stem. They will then flower through autumn and early winter."

DAHLIAS (*Mrs. J. Jenson*).—"The dahlia first originated from Central and South America where in its natural state it is a scraggly bush 6ft. or 7ft. high bearing single blooms of a purplish colour. They were named after Dr. Dahl, a Danish botanist. Dahlias are a good late summer or early autumn flower, and with proper care and attention bloom for 2 or 3 months. There are many varieties such as Cactus, Decorative, Pompone, Collarette, Paeony, &c. The Cactus type has long narrow petals which are twisted, curled, and pointed, while the Decorative is the very largest of all, holding its beautiful flowers on stiff stems well above the foliage. When well grown some of the flowers are almost a foot across and make a show in any garden. Pompone dahlias are like a honeycomb ball, and last the longest when picked. Collarette dahlias are one of the most popular. The flowers are large and single, with a fringe of small thin petails surrounding the centre, the fringe being a different colour from the petals. The Paeonys have very large flowers with petals loosely arranged, they are fine for cutting. The best time for planting in this district is the end of November or early in December, then they will not be flowering in the hottest part of summer. Seeds must be sown in September, they will then flower the first season. Sow the seeds in a plot and when about 5in. or 6in. high plant out. Seedling dahlias change colour until 3 years old. When deciding where to plant, choose a place if possible where they will be sheltered from wind and have a fair amount of sun. Where the ground is black and heavy plenty of sand and manure are necessary. Where the soil is sandy all that is necessary is manure. Spread the sand over the garden, cover with manure and dig fairly deep, turning it well over. After digging, rake well to break all lumps. If the bulbs are very large divide them, this must not be done until they have "shot," as they are likely to die if cut up without shoots. Plant in rows 3ft. apart either way and about twice their own depth, this gives them plenty of cover, food, and strength to send up and hold flowers and foliage. Bulbs planted too near the surface become sunburnt and are ruined. If the ground is dry when planted, give a good watering. Water is one of the main things for the growth of the bulbs. When the bushes are about 2½ft. to 3ft. high, prune them back. If large flowers are wanted take out all the side shoots and leave only the main ones, but if a lot of flowers are needed take out main ones and leave the others. These grow out and make them more bushy. When finished flowering, if cut down to within a foot of the roots they will flower again in a few weeks. After they have done flowering dig up and put away where frost will not hurt them."

THE GROWING OF DELPHINIUMS (*Miss K. Hutchesson*).—"No plants are more beautiful in the garden than Blue Delphiniums. They are one of the most popular as well as beautiful perennial plants for the garden and indoors. The best results will be obtained by planting the one-year or two-year crowns. Larger and stronger plants will be obtained from the two-year crowns. For the planting of these flowers a rich deep loam to which a liberal supply of cow manure or leaf mould is worked in with a sprinkling of superphosphate or bonedust gives excellent results. Best results will be obtained if planted where they will only get the morning sun, but they also do well if planted in the open. Watch the Delphinium plants for pests, especially snails and slugs. To prevent them, frequently dust the plants with lime. By covering

coarse sand or scattering shell grit over the plants that are awakening from their rest a protection from slugs will also be given. It is not necessary to lift or divide these clumps every year.'' (Secretary, Mrs. Hutchesson.)

MUNDALLA (Average annual rainfall, 19.26in.).

June 20th.—Attendance, 15.

CUTTING OUT GARMENTS.—Miss Fisher first illustrated, by means of a blackboard and model, the methods of measuring and cutting out, and then read the following paper:—''Every girl and woman possesses a personality, but this personality is not expressed to the best advantage when one does not take a certain pride in the matter of clothes. There are many who say they cannot afford to dress well. If personality rests on buying Paris models, then it is quite true that many may not be able to afford the expense of clothing. The two essential points to remember in dressmaking are accuracy and neatness. Accuracy in measurements, cut, and fit; neatness in making, finishing and pressing. Each warehouse and shop stocks sizes to fit a normal woman's figure, therefore women, who are under and above those sizes, find it more satisfactory to make their own clothes, it is also more saving. The wearing of different underclothes gives a decided distinction. If making a frock for anyone, point out to the lady that so far as possible, it is better to wear underclothes of the same thickness when being measured as she will be wearing when she is to try on the frock. If a measurement is taken over silk underwear and the ''try on'' is made over woollens, the garment is apt to appear tight, or if tried on over silk, it may appear a little loose. When measuring around the waist, bust, hips, and armholes, the tape should not be pulled too tightly, but be just firm enough so that a finger can be placed underneath the tape between the figure and the tape measure itself. Also, take notice whether the neck be short and thick, or long and thin, bcause a short thick neck needs a narrow collar, and a long neck a wider one to take off the effect of the length. It is just as important to be able to select a design from a fashion journal as it is to know how to choose material for the garment desired. No fashion paper can be an absolute guide as to design. It can help by suggesting and giving ideas. If you like a frock, but are afraid it may be unbecoming, try to think how the design may be modified and adapted to suit you—perhaps the slightest change will make all the difference. Do not imagine that to be smartly dressed it is necessary to make an exact copy of a design. The designs are there to give ideas to represent the fashions. The correct and incorrect way to lay out material: This may not convey very much, but it really means saving pounds in the cost of materials that are purchased when making garments. The way that most people judge what quantity of material they intend buying for their dress is by taking their length and saying, 'I will want twice as much and about ¾yd. for sleeves.' The first and most important thing to be taken into consideration is the width of the material. All materials, whether they be linen, fuji, crepe de chine, or woollens 54in. material, should be opened flat out, and the pattern set on and marked carefully with chalk before attempting to cut into the material. Before cutting see that the patterns are pinned carefully and that they are smoothly placed on the material Always keep the material flat on the table while pinning. When cutting out, hold the scissors firmly in the right hand to make long cuts. Never lift the material from the table while cutting. Care must be taken to have meeting exactly all waistlines, length of skirt, and sleeve, neck, armholes, and shoulder lines of bodice and blouse. The important thing to remember when binding is that all binding must be cut on the cross or on the bias. A straight binding never lies flat. When making garments of velvet, always cut so that the pile runs the one way. Velvet or velveteens must never be pressed flat on the table with an iron, but the seams held at each end and passed over the iron. If a mistake has been made by not testing a small piece of material by damping first and thereby causing the portion of the garments to shrink where it has been pressed, the whole garment will have to be damped and pressed to correspond. Shiny spots on material can be removed by steaming. If a seam is at all puckered, get someone to hold each end of the seam while the iron is passed firmly backwards and forwards along the centre of the seam, until it is quite smooth.'' (Secretary, Miss M. Scown.)

TAPLAN.

June 25th.

THE CARE OF INCUBATOR CHICKENS.—Paper read by Mrs. P. Flynn:—''This is a very interesting hobby for any person who has a little time to spare; and although not so profitable as it used to be, there is still money to be made from good laying hens. First, our locality must be considered and as we are too far from the City to raise the table birds, we must turn our attention to the laying strains. The White Leghorn is

the best breed for eggs. To hatch any quantity of chickens, an incubator is necessary. Start the machine in June and run it until September, then stop until early February. The chickens hatched in February, March and April do very well; the days are warm and the nights are not very cold. They have every chance to thrive well, and start laying early in spring; by doing this you can save at least 2 months' feed, *i.e.*, by not hatching late in summer. I put water in the trays right from the first day, and put fresh water in a few days before the eggs are expected to hatch. Be careful not to chill the chicks when removing them from the incubator. Take a basket or small box, put chicks in and cover with a towel, put them in a brooder. If a heated brooder is not available, then a little more trouble must be taken for the first few days. Take a flat box about 6in. deep and 2ft. long for about 50 chicks, put clean fine sand in bottom, put in the chicks and, if a nice sunny day, put them in the sun. They do not require any food until they are a day old or more. It is very easy to tell when the little chicks are cold, they all huddle together. It is advisable then to cover them with an old flannel then after a while they will come out looking for feed. See that you have a wire netting frame to cover the top of the box to keep them safe from birds and cats. To put away the chicks for the night, have another box, a deeper one this time. Cover the bottom 3 or 4 inches deep with chaff, put in the chicks and cover with flannel, put the flannel down in the middle so that it will rest on the chickens and keep them warm. Put the box inside for the night. These hints are only for very young chicks. When they are a week old, they can be put in a run that is proof against birds, and a simple brooder made for them. Take a kerosene case, lay it on its side, have a false top inserted with the back of it half way to the bottom. This forms a slanting roof, strips of flannel should be hanging down connected to the false top, a stone jar filled with hot water and wrapped in flannel, should be inserted every night and morning if the weather is cold. A few points on feeding, give a little milk or water, No. 1 chicks food or finely cracked grain and a little oatmeal mixed for the first week, after that cracked grain, and dry bran; and if they will eat it, lettuce and a little meat liver is very good. Scraps from the table can also be fed. See that they do not get wet tramping in the water. A good plan is to take a jam tin and make a small hole with a nail, a quarter of an inch from the top, fill tin with water, clap a saucer on top and turn it up side down, this will fill the saucer with water up to the nail hole, and keep the chicks from tramping in the water. It is best to tie the tin down as the chicks grow older. Keep all yards clean and keep water in shady places. Do not overcrowd and by attending to these simple rules, you should have no difficulty in rearing chickens.''

CARE OF THE HAIR AND FEET.—Paper read by Miss R. Gogler: ''*The Hair*· Something in the dry air of the mallee districts, added perhaps to neglect, soon causes the hair to lose its shine and to become hard to dress. A few minutes devoted nightly to its care, or as often as can be managed, will work wonders. Sometimes people exclaim with a worried look, ''My hair is falling out dreadfully. What shall I do?'' Really, this happens every autumn in order to make room for new growth. A good deal depends on one's general health. If one is run down, the loss of hair will be greater. Brushing and massage for 5 minutes every night helps greatly. This exercises the scalp and keeps the oil glands functioning properly. A sun bath should be taken as often as possible. Run the fingers upwards through the hair to allow light and air to reach the roots. The majority of cases of falling hair is due to infection of the scalp with dandruff. This is a serious trouble caused by the enlargement of glands to which the hair is attached and a consequent flow of liquid from these glands builds up horny scales which cover the skin with a thick layer of dandruff. It affects the normal blood circulation and compresses the roots of the hair, which means that, as the roots are not getting sufficient nourishment, they shrink and finally die and fall out. To remove the oily scales, apply very warm olive oil to the scalp at least once a week and cover the head with a towel to prevent soiling the pillow case. This causes the head to become hot and the oil will sink deeper into the roots of the hair. A soft soap (which contains no alkali or resin) or coal tar soap makes the best shampoo. Wet the hair with warm water and rub soap into the scalp; leave on for 10 to 15 minutes rubbing all the time, then rinse thoroughly in cool water. The scalp should be dried quickly and rubbed briskly with a rough towel. If the hair is too dry, it should be washed only once in 3 or 4 weeks and olive oil rubbed into the scalp after the shampoo to keep the scalp nourished. Brilliantine dressing has the double advantage of adding oil to the scalp and giving a brilliant shine to dull hair. For those whose fair hair is darkening, the only remedy is bleaching, but this is not advisable as the new hair growing will be darker than the old, and the effect rather patchy. Frequent brushing and massaging the scalp with a rotary movement of the fingers gives a brilliant gloss. The juice of half a lemon added to the last rinse helps to keep the hair fair.

The Feet: After a day of standing on the feet, one feels glad to sit down and give them a rest. When sitting mending or reading, have a bowl and a kettle of boiling water beside you. Add bicarb. soda or salt to some water and soak the feet until the water is cold. Dry thoroughly, then massage upwards from the toes with an embrocation of equal parts of olive oil and methylated spirits. If the feet are tender or perspire excessively, rub them with spirit or liquid witch hazel. Dust the feet and the insides of the shoes with boracic acid. Shoes should be roomy and well fitting with medium heels and a well-supported arch. The best cut of shoe for those with troublesome feet is one in which the inside is cut almost straight from the instep to the toe, just curving slightly towards the toe. This gives the toes room to rest in their natural position. Continual wearing of slippers is most injurious, it allows the feet to sprawl and causes the arch to drop. It often is a relief to change the shoes several times a day, and change stockings frequently too. For excessive perspiration, regular soaking in warm water to which a handful of common salt and 2 tablespoons of washing soda have been dissolved, relieves them. Rinse with cold water after soaking for 10 minutes and rub common salt into the feet and ankles. Dry and rub with eucalyptus or methylated spirits. Iodex or Rexona are splendid for rubbing. There is a good exercise to strengthen the muscles of the feet and ankles. Sit on a comfortable chair and extend the right leg. Stretch the foot right out, then turn the toes alternately up and down as hard as possible. Then twist the foot round in circles, making the circles as large as possible. Twist them both ways, then repeat with the left leg. Another is to stand with feet together, and practise heel raising, moving the heels as far from the ground as you can. This gives the arch of the foot exercise.''

WARCOWIE (Average annual rainfall, 12.31in.).

June 28th.—Attendance: 11.

HOUSEHOLD HINTS.—(Mrs. E. Jarvis).—Always keep turpentine on hand; it is a splendid remedy for burns, and, if mixed with flour, a first rate remedy for corns, Boot polish that has become hard can be softened if a few drops of turps are added; also add a few drops to the stove polish—it gives a brilliant polish. To get rid of cockroaches, sprinkle powdered borax about all cracks and corners; they will soon disappear. Coffee or tea stains can be removed if put into water to which a little kerosene has been added. To preserve the brilliancy of white-handled knives, give them an occasional rub with the juice of a lemon. To sharpen scissors, take a bottle and work the scissors along the neck as if to cut it; repeat this about a dozen times. Mint sauce is improved by putting 2 tablespoons of boiling water over the mint and sugar 10 minutes before adding the vinegar. If a layer of white sugar is placed in the bottom of a biscuit tin the biscuits will keep fresh and crisp for months, even though the tin is not air-tight. To whip cream during hot weather, add as much cornflour as will cover a 2s. piece to ½ pint of cream. 1 teaspoon of cold water added to the white of an egg before whipping will increase the quantity Before roasting meat, sprinkle flour over it; the gravy will then be a rich brown. Add a little vinegar to the water in which meat is stewed or boiled; it will make tough meat tender. Add 1 cup of thick sour milk to the water to be used for mixing bread; it will prevent it from becoming ropey during summer. (Mrs. E. Sanders).—Tablecloths are inclined to tear at the corners because of the pulling required to get them into shape again. A small piece of linen sewn at the edge of the cloth at each corner will strengthen them considerably. To darn linen quickly, neatly tack a piece of muslin underneath the worn or torn part; then, using a sewing machine, darn backwards and forwards, keeping the lines of stitching straight and even. Trim off the muslin underneath, and when the article has been laundered the darn will hardly show. Windows and mirrors can be cleaned with thin cold starch, which is wiped off with a soft cloth after being allowed to dry thoroughly. Use thick boiled starch to paste covers on jam jars. Do not put pepper into rissoles or fritters to be fried, as it will break them up. Put a few seedless raisins in the breakfast porridge; it improves the flavour. Raspberry jam being very scarce, it is a very good plan to take 1 tin of dark plum and mix with 1 tin of raspberry. Avoid making jam of any sort in wet weather; it will not keep long, and tends to mould. It is often found that a custard will go watery. If it is a baked custard it is caused by the oven being too hot, and, if boiled, by using too much sugar. To rid a place of cockroaches, scoop out half a potato and fill with borax; place where the cockroaches are, and they will all disappear. A pen nib will not become rusty while not in use if it is stuck in a raw potato. A boiled potato used frequently instead of soap will keep the hands soft and white. If fat becomes burnt while frying,

drop a few pieces of raw potato into it and leave for a minute or so, after which all traces of burning will have disappeared. When windows are difficult to open, rub the cords with soft soap, and the sashes will run smoothly. Fat will not splutter while frying if a little flour is sprinkled into it before the cold food is put in. When poaching eggs, add a small piece of butter to the water to prevent the eggs from sticking to the pan. If an aluminium vessel is burnt it can easily be cleaned by boiling an onion in it. Left-over mustard will keep fresh if covered with water; pour the water off before using. (Secretary, Mrs. A. Crossman.)

WASLEYS.

July 5th.—Attendance, 29.

Rose Culture.—Paper read by Mrs. J. Hancock:—"There are different types of roses, standard, dwarf, and climbing. Standard roses are best grown where small annuals are to be planted. The dwarfs are best in a bed to themselves. Dwarf roses give best results, the wind does not bruise them so much, being lower and firmer, and I get the best and most blooms from these bushes. June is the best time to secure plants. Prepare the ground, digging it all over, and then take out holes to a depth of 12in. to 18in., and loosen the bottom soil with a fork. In new soil, manure is not necessary, but with soil that has been used for garden purposes put manure in the bottom soil and dig it in well, seeing that the roots of the roses do not come in contact with the manure. Then fill up with top soil, allowing about 9in. open to plant the rose trees. Standard roses should be planted about 9in. deep, and for dwarfs the soil should come to where it has been budded or close up to the first limbs. When planting see that the roots are spread out evenly before filling in the hole. Standards need a stake alongside to keep them in position, then firm the soil and give a good watering. Start pruning the first week in July, if pruned before, the bushes shoot too early and frosts very often nip them. Prune the poor growers hard and the vigorous grower not so much. Prune back to about 4 buds on the strong growing roses and perhaps 2 or 3 buds on the poor grower, seeing that the top buds point outwards. Keep the centre of the bush open by cutting spindly branches out and branches that cross over. When the roses commence to shoot, rub buds off pointing inwards, they fill up the bush and are of no use. About September apply a mulch of decayed manure to retain the moisture. If wanting show blooms, disbud to make better blooms, perhaps leaving one or two on stem. Sometimes in spring, when buds are forming, green aphis attacks them. Spray with a solution of soap suds and black leaf 40, which quickly kills them. After the spring flowering is over clean up the bushes by cutting back to a bud pointing outwards. I never let my roses want for water and have flowers continually throughout summer. Sprinkling is no good, let the hose run steadily for some hours, a good soaking lasts for several weeks. About March I give a good watering and then apply liquid manure to get the autumn flowers which I think are the best all throughout the year. Do not apply liquid manure without watering the roses first, it has a tendency to burn them; about ½gall. to each rose. Roses will not give best results if you leave the dead flowers on and sometimes go to seed. Also keep briars cut back at the bottom, if any should appear dig down with a spade and cut back as far as possible. If some of the roses are poor growers and do not give the best of flowers, it is just as well to have a good sort budded on them. Time to bud is December, and water well after budding to send the sap flowing. If needing more bushes of the best roses, success is often possible by cuttings taken from them and inserted in soil to two-thirds of length of cutting. The best time to do this is April or May, and water well. A few roses that are well worth a place in any garden:—Firstly Golden Emblem, one of the best yellow roses grown; Hadley, a red, very sweetly scented; Madam Abel Chatenay, a pretty pink; Mrs. Herbert Stevens, a constantly flowering white rose; Madam Edward Herriot, a tangerine; Shot Silk, shaded pinks; and Edward Mawley. Lorraine Lee is a pink, flowers a good deal in winter and needs pruning in March, and a wonderful grower, and flowers when roses are scarce."

A paper on "The Garden" was read by Miss A. Buckby, and Miss D. Sanders spoke on "Soap Making." (Secretary, Miss J. Braun.)

WIRRILLA, April 5th.

BREAKFAST DISHES.—By Mrs. W. R. Woods:—*Devilled Meat*: Put in a small frying pan 1 good dessert spoon butter, 1 teaspoon curry powder, 1 dessert spoon vinegar, pepper, salt, a little cayenne to taste, grate of nutmeg, also a little tomato sauce if liked. Cut slices of cold meat and simmer very gently in the mixture, turning once. The meat should only heat, not cook or brown, or it becomes tough. Serve on hot buttered toast. A good breakfast or luncheon dish for a small family. *Kidney Savoury*: Remove all fat and skin from 3 kidneys, chop them fine. Put small pieces of butter in saucepan, when hot, put in 1 teaspoon of chopped shallots and cook for 3 minutes, taking care not to let shallots brown. Then add the chopped kidneys and cook 5 minutes, sprinkle in about ½ teaspoon of flour, season them. Moisten with 2 tablespoons of good gravy, cook for 2 minutes longer. Serve on buttered toast, sprinkle with chopped parsley. *Crumpets*: Break 2 eggs into a basin. Beat slightly and add 2 teaspoons sugar. Sift ½lb. S.R. flour in another basin and pour in eggs to make a light dough (a little milk may be needed). Work quickly, roll to ½in. thick, cut into rounds. Prick with a fork, bake in hot oven for about 10 minutes, Tear open and butter while hot. Serve at once. *Tasty Dish made from Cold Meat*: Cut the cold meat very small, add 1 onion also cut small, pepper and salt to taste, just cover with water and stew gently for about three-quarters of an hour. Thicken with a little flour, have ready some slices of toast well buttered and heap on top of toast. *Another Cold Meat Recipe*: Mince the cold meat, season with pepper and salt, and grated nutmeg, moisten with water. Tomatoes added are an improvement. If adding tomatoes do not use too much water, as it must not be too wet. Pile on hot buttered toast. *To Use Stale Bread*: Cut 4 fairly thick slices of bread, dip lightly into mixture made up of 1 egg well beaten, ½ cupful milk, 1 pinch each salt and pepper. Fry in dripping until nicely browned, serve with fried bacon. *Tomato Toast*: Chop up a little bacon and put into a small saucepan to cook with a small piece of butter for a few minutes. Then add 2 or 3 tomatoes which have been skinned and cut up, and a little pepper. When tomatoes are well cooked break in 2 eggs and stir well. When thick enough put on the pieces of buttered toast. *Creamed Sausages*: Partly boil the sausages for 10 minutes, put them into cold water and bring to boil and boil 10 minutes. Then skin the sausages. Bring ½ pint of milk (with ½oz. butter dissolved in it) to a boil and thicken with cornflour. Remove from fire and season to taste with tomato sauce. Cut sausages into dice and add to the mixture. Pour over buttered toast and serve hot. *Nest Eggs*: 1½lbs. mashed potatoes, 2 tablespoons milk, 2ozs. butter, salt and pepper and eggs. Make the potatoes very hot, add butter, milk, and seasoning. Form into round shape with spoon on hot baking dish. Break an egg into each and bake in a hot oven until set. Serve hot. *Omelette*: Separate the yolks of two or three eggs from the whites. Beat the yolks with a little salt and pepper, add 1 tablespoon S.R. flour, 2 tablespoons cream or milk and a little chopped parsley. Beat whites separately and mix all together, have frying pan ready with boiling butter, pour in the mixture. Cook over a slow fire. When set and a light brown, roll over like a pancake and serve hot. Before cooking milk or eggs (omelettes and pancakes in particular) scour the pan with salt and rinse with hot water to prevent burning. See that the omelette pan is thoroughly dry before putting in the batter.

SMALL CAKES AND BISCUITS.—Meeting held June 7th. Recipes supplied by Mrs. A. Evans:—*Peach Cakes*: 6ozs. each butter, flour, and sugar, ½ teaspoon baking powder, 5 drops essence pineapple, 2 eggs. Bake in hot buttered gem scone trays and paint with carmine diluted in water and roll in castor sugar. *Plain Biscuits*: 3 cups S.R. flour, 1 cup each sugar and butter, 2 eggs, 4 tablespoons milk. Beat sugar and butter to a cream, add eggs one at a time and beat well, then the milk and lastly flour. *Queen Cakes*: 1lb. flour, ½lb. butter, 1 teaspoon baking powder, ½lb. sugar, ½ cup cream, 3 eggs, 1 cup currants. Beat butter and sugar to a cream, add eggs one by one, then add cream and currants and enough milk to make cake mixture. *Lunch Buns*: 3 cups S.R. flour, 1 cup each sugar and dripping, 2 eggs. Beat sugar and dripping to a cream, add eggs and beat well, add 4 tablespoons milk and sultanas, roll in balls and dip in sugar. Bake in moderate oven. (Secretary, Mrs. W. Jones.)

THE ICING AND DECORATING OF CAKES.

[By Mrs. P. E. C. DANIEL, Warramboo.]

(*Paper read at the Conference of Eyre's Peninsula Branches, at Kyancutta, on September 7th.*)

The decorating of a cake is just as important as the baking, and a plain cake can be made into an elaborate affair with a little time and patience, and many a cake which looks a failure when it comes out of the oven is quite unrecognisable after the icing process.

One of the most important points is the mixing of the icing. For sponges, I prefer mixing with hot water and a little butter to prevent cracking, and for flavouring, vanilla is used mostly. The icing is smoothed off with a knife dipped in hot water. Then if a pump is available it is quite a simple matter to make a neat edging around the cake, and perhaps a few other decorations, such as cocoanut or nonpariels in the centre.

The fillings add to the attraction of a sponge. With children jelly filling is most popular. The jelly should be just set, but not hard, and mashed with a fork before it is put in the cake. Then it will stick well. Whipped cream is another easy filling.

There are the other type of cakes for celebrating weddings, birthdays, and Christmas, etc. The correct procedure is to have almond paste for the first coating. This consists of ground almonds and icing or castor sugar, ratafia and vanilla flavourings, and is mixed with eggs, yolk and all. It can be purchased ready mixed from the confectioners. To make the paste stick, it is necessary to brush the cake over with white of egg before applying. This coating is left for several days to harden. The mixing of the plain icing is done with white of egg, and must be stiff enough to hang from the knife if held up. The cake will need one or two coatings of plain icing, this depends on the importance of the occasion, or the length of time the cake is to be kept, as the grease from the cake is apt to come through in spots if the icing is not thick enough. Each coat as it is applied must be smoothed over with a knife dipped in hot water. If the final coating is to be white, a little washing blue is added.

When the final coating is perfectly dry decorating is the next step. The icing must be mixed carefully, for if it is not stiff enough it will fall out of shape. The design should be pencilled on the cake first, and with the help of a bottle of silver cachous an attractive cake can be turned out. Bought ornaments look very nice, but are rather too expensive for ordinary occasions.

A fancy top ornament is necessary for a wedding cake. These will cost anything from 5s. upwards. When using pillars it is necessary to have white cardboard under each storey. Pillars are rather an expensive item, but nice ones can be made by sawing a broom handle into the desired lengths and covering with white or silver paper, or for a birthday cake they look very nice pink.

Decorating cakes is a very fascinating pastime, but requires a fair amount of time and a steady hand.

BISCUIT COMPETITION RECIPES.—One member's exhibit was made with dripping, no butter being used in any of the varieties, the biscuits were sampled and proved to be excellent, these biscuits will keep as well as those made with butter. Following are some of the recipes, the first 6 being the first prize:—*Honey Biscuits*: 1lb. sugar, 1 cup honey, 3 eggs, 2 teaspoons c. soda, 1 teaspoon ground ginger, cinnamon and a little spice, about 5 cups flour. Roll in balls, place nut on top and bake. *Cocoanut Crispies*: 2 cups rolled oats, 2 tablespoons golden syrup, 1 cup flour, 6ozs. butter, 1 cup each sugar and cocoanut, small teaspoon vanilla, 1 teaspoon carb. soda in 3 tablespoons of hot water. Mix butter and sugar, add syrup then soda in hot water, rolled oats, cocoanut, and flour. Drop on tray with teaspoon and bake in slow oven. *Walnut Fingers*: ¼lb. butter, 2ozs. sugar, ½lb. flour, 1 teaspoon c. tartar, ½ c. soda, yolk of 1 egg, essence of vanilla, a little warm water. Cream butter and sugar, add egg, flour, enough warm water to mix into stiff dough. Roll out and spread with icing made with white of egg and ¼lb. icing sugar, flavour with vanilla, scatter chopped walnuts on top and cut into fingers. Bake in a moderate oven. *Raspberry Sandwich Biscuit*: 4 cups flour, 1½ cups sugar, ½lb. butter, 3 eggs, 2 teaspoons c. tartar, 1 carb. soda. Roll out

as thin as possible, cut and bake in a quick oven. Spread jam between while hot. *Shortbread Creams*: ¼lb. butter, 2ozs. sugar, ½lb. flour, 1 teaspoon c. tartar, ½ carb. soda, yolk of 1 egg, little warm water. Cream butter and sugar, add egg, then dry ingredients; roll and cut into shapes, and bake. When done join two together with icing. *Melting Moments*: 6ozs. butter, 7 tablespoons plain flour, 2 tablespoons each cornflour and icing sugar. Beat butter to a cream, then add dry ingredients. Make into little balls with the hands and press on top with a fork. Bake in a slow oven. *Glenroy Biscuits*: ½lb. butter, ¼lb. sugar, ¾lb. S.R. flour, 2 eggs. *Brown Biscuits*: 2 cups rolled oats, 1 cup sugar, 6ozs. butter, 1 cup cocoanut, 1 teaspoon vanilla, 1 teaspoon carb. soda in 4 tablespoons boiling water, 1 tablespoon each treacle and golden syrup. *Cheese Biscuits*: 3ozs. flour, ¼ teaspoon baking powder, 2ozs. grated cheese, 1oz. butter, pinch salt, yolk 1 egg, squeeze lemon juice, a little cayenne, and a little cold water to mix. *Sao Biscuits*: 2 cups flour, 1 tablespoon cornflour, pinch salt, ¼ teaspoon baking powder, sift together and rub in 2 tablespoons butter. Mix to a stiff dough with a little milk. Roll out very thinly, cut with round cutter and prick with a fork. *Shrewsberry Biscuits*: ½ cup flour, ¼lb. sugar, ¼lb. butter, 1 egg, flavouring or 1 teaspoon lemon juice. Cream butter and sugar, add egg. Roll into balls and dip in sugar. Bake on greased slide, press flat with prongs of fork, pressed both ways. Bake 15 minutes. *Spiced Honey Nuts*: 2ozs. each butter and sugar, 1 egg, ½ cup honey, 6ozs. S.R. flour, pinch salt, 2 teaspoons cinnamon, 1 cup nuts. Drop in teaspoons on greased slide, leaving room to spread. *Chocolate Biscuits*: 4ozs. flour (S.R.), 2ozs. each sugar and butter, 1 egg, ¼ teaspoon vanilla, ½ teaspoon mixed spice, 1 dessertspoon cocoa, a few chopped almonds (pinch salt if desired). Cream butter and sugar, add egg, and beat well. Add vanilla, spice, and cocoa, then sifted flour. Put through forcer on to greased slide, sprinkle with chopped almonds. Bake in moderate oven 10 minutes. *Ginger Biscuits*: 2 cups flour, 1 cup sugar, 6 level tablespoons dripping, 2 tablespoons treacle, 3 tablespoons ginger, 2 eggs, 1 teaspoon c. tartar, ½ carb. soda. Beat sugar and dripping, add eggs, treacle, and ginger, add flour and rising. Drop on greased slide. If rolled in the hands they make a better shape. *Afternoon Tea Biscuits*: 3 tablespoons each flour, cornflour, sugar, and butter, 1 teaspoon c. tartar, ½ carb. soda, mix with 1 egg. Roll out thinly, cut into shapes. Bake 10 minutes. *Avon Biscuits*: ¼lb. butter, ¼lb. sugar, 3 cups sugar, 2 teaspoons c. tartar, 1 teaspoon soda, sifted in flour, 1 egg. Rub butter in flour and sugar, mix with yolk of egg beaten in ½ cup water. Roll out and ice with icing made with white of egg and icing. Cut into fingers. Bake 10 minutes. (Secretary, Mrs. E. Kidman.)

July 4th.—Attendance, 42.

A butter competition was held. Forty-one competitors entered for the trophy presented by Mr. A. Robertson of Struan House. The Government Instructor (Mr. W. H. Downes) judged and commenting on the standard of exhibits said there was marked improvement on the 1933 competition. Mr. Downes discussed exhibits with the owners and gave practical advice as to improvement. The successful competitors were:—Miss McCorquindale, first; Mrs. R. McDonald, second; Miss F. McDonnell and Mrs. Clifford, tied third. (Secretary, Mrs. E. Kidman.)

PICKLING GHERKINS SO THAT THEY RETAIN THEIR GREEN COLOUR.

The first requisite to success in pickle-making is good vinegar—strong and pungent. Gherkins need only to be washed and drained thoroughly to be ready for pickling. Do not use a copper vessel in any part of the process of pickle-making, but use instead a porcelain-lined preserving vessel. Vinegar boiled in copper forms acetate of copper, which is poison. To retain the green colour of gherkins, add parsley to the vinegar some days before pickling, and let it steep until ready for use, when the vinegar ought to have a decided green colour, which colour will of necessity be imparted to the gherkins. The process is then as follows:—Take, say, two hundred gherkins. Cover with cold water, to which add a pint of salt; let stand over night. In the morning drain off the water, then measure and take as much vinegar (coloured by parsley) as you have water (i.e., drained from gherkins), 1oz. of allspice and a piece of alum the size of a walnut. Boil the vinegar and spices, etc., and pour, boiling hot, over the gherkins. Cover with green cabbage leaves. A few green peppers in the vinegar give an added flavour and are a great improvement.—*New South Wales Agricultural Gazette.*

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. DECEMBER, 1934. No. 5.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

River Murray Swamp Areas, at Murray Bridge (Jervois Branch), Thursday, February 21st (F. P. Baily, Woods Point, Secretary).

Yorke Peninsula, at Kadina (Boor's Plains Branch), March 6th, S. G. Chynoweth, (Secretary).

Mid-North, at Redhill, Thursday, March 14th (S. A. Pengilly, Secretary).

South-East (Upper), at Mundalla, Wednesday, March 20th (A. Ross, Secretary).

South-East (Lower), at Mount Gambier, Wednesday, April 10th (G. T. Gurry), Secretary).

River Murray, at Moorook, Thursday, June 20th (S. Perkins, Secretary).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Standard Cornsacks.

Following the Congress resolution relating to cornsacks, the Collector of Customs states that the standard for new cornsacks as prescribed by proclamation is as follows:—Size, 41in. by 23in.; weight when baled, 2¼lb.; substance, 8 porter, 9 shot. The importation of secondhand cornsacks is authorised, provided they comply with the following conditions:—(*a*) That as regards size and weight the sacks do not vary more than 5 per cent. from the standard prescribed for new cornsacks; (*b*) that the sacks are approximately of standard porter and shot; (*c*) that the sacks are clean and free from patches and holes. The importation in the Commonwealth of cornsacks other than those complying with the foregoing standards is prohibited, and any importation made of cornsacks not complying with the proclaimed standard would be liable to seizure and confiscation under the Customs Act.

Arsenate of Lead—Analyses of Samples.

It is usual for the Department of Agriculture to collect each year from local manufacturers the various brands of arsenate of lead powders which they have for sale and to submit the samples to analyses for the information of fruitgrowers and others. This year the samples were collected in October, and the Analyst's report on them reads as folows:—

"The samples (six) of arsenate of lead powders, received on November 12th, 1934, No. 517, have been analysed with the following results:—

No.	Brand.	Moisture.	Total Lead (PbO)	Total Arsenic (As_2O_5)	Water Soluble Arsenic. (As_2O_5)	Suspension Test. Five Mins.	Suspension Test. Thirty Mins.
		%	%	%	%	%	%
1.	"Vallo"	0.52	64.0	30.9	0.11	32.8	10.7
2.	Hemingway's	0.53	64.4	31.4	0.14	83.0	60.3
3.	"Aero"	0.68	64.5	31.3	0.17	64.0	45.4
4.	"Lion"	0.27	64.0	32.0	0.11	25.6	9.0
5.	"Orchard"	0.27	64.2	32.8	0.11	27.3	52.8
6.	"Palmprest"	0 25	64.6	32.0	0.17	35.2	9.1

Dehorning Calves.

Replying to the Secretary of the Mangalo Branch of the Agricultural Branch, who asked (1) the correct age when to dehorn cattle, and (2) how to dehorn calves six months of age, Mr. C. McKenna, B.V.Sc., M.R.C.V.S., of the Stock

and Brands Department, says the best age to dehorn cattle is when calves are two-three days old. At this age the horns are present as "buttons" loose from the skull Clip hair away around these buttons, moisten them with water and rub until soft. Then a stick of caustic potash should be carefully touched with water and rubbed into skin over embryo horn. Do not have sufficient water to allow it to run down the side of the face—this will burn off hair and cause sores. When the scab over the horn falls off, apply the caustic stick a second time. The best way to do the calves six months old is to throw them and cut off the horns level with the skull with a sharp broad chisel. Stop the bleeding by applying a hot iron and dress with the following dressing:—Creosote, 1 part; oil of turpentine, 6 parts; raw linseed oil, 20 parts.

Greasy Heel in Horses.

Mr. A. H. Robin, B.V.S. (Stock and Brands Department) advises the Secretary of the Miltalie Branch of the Agricultural Bureau that if the case is one of simple greasy heel, where the lesions are superficial and situated below the fetlock, it will readily respond to the following simple treatment:—Clip hair from affected part and wash the part thoroughly with soft soap and water in which is dissolved some washing soda (at the rate of 1 teaspoon to the pint) to remove scabs, &c., after which the part should be carefully dried with a clean soft cloth. Then dress affected part twice daily with the following lotion:—Liquor plumbi subacetatis, 1oz.; methylated spirits, 8ozs.; water, 1 quart. When weeping on the part is checked, complete treatment by daily applications of zinc ointment. The horse should be kept at rest on dry, clean standing. If the condition is the more serious one known as "grease" and extends over the fetlock and up the back of the leg, it will prove much more difficult to deal with. If taken in the very early stages, the application of the lotion mentioned above may check the trouble. If the case, however, is more advanced, the following treatment should be tried:—Rub in to the affected area some liquor ferri perchlor. fort., applying this on a piece of tow or cotton wool wrapped round one end of a piece of stick. This dressing should be applied every three or four days to begin with and later once a week. If after a time applications of this seem to lose effect, rub in daily for a week the following powder instead:—Boracic acid, powdered lime, common salt (equal parts of each). Then resume the treatment with the iron solution. After the preliminary washing at the commencement of treatment, do not wash the parts again—this is very important. Remove any discharge, &c., subsequently by rubbing with clean cotton wool.

Polished Clover Seed.

Replying to the Secretary of the MacGillivray Branch of the Agricultural Bureau, who asked: "What effect does the polishing of clover seed have on its germination, Mr. R. C. Scott (Superintendent of Experimental Work) says the polishing of clover seed would not have any effect so far as a reduction in the germination percentage is concerned. In the case of some tough-skinned clovers, such as Strawberry Clover, it is quite a common practice to subject the seed to a rubbing process with sand or emery paper to improve germination, and such action would probably be of advantage to the proportion of hard seeds which Subterranean Clover usually contains. However, the ordinary polishing to improve the appearance of the grain for commercial purposes would have no influence on its germination.

Breeding, Feeding, and Diseases of Sheep.

The Library of the Department of Agriculture acknowledges the receipt of the October, 1934, number of "The Veterinary Journal—an issue devoted solely to the Breeding, Feeding, and Diseases of Sheep." Copies of the journal can be obtained from Messrs. Bailliere, Tindall & Cox, Henrietta Street, Covent Garden, London, W.C.2, at the price of 2s. 2d., post free.

GENERALITIES CONCERNING FARM POULTRY.

[Paper read by C. F. ANDERSON (Government Poultry Expert) at the 45th Congress of the Agricultural Bureau.]

Because of the fact that during recent years more attention is being devoted to the poultry industry, with a natural desire for more information as to the methods to be adopted, the following points concerning various branches of the industry should be of interest.

Poultry keeping has been practised for many years. In Gent's *Systema Agriculturae* published in 1675, the keeping of fowls for profit is advocated and advice given as to management, but it contains no description of the different breeds.

POULTRY ON SMALL HOLDINGS.

From a State point of view, it is generally accepted that there are possibilities for further extension of smaller holdings in various parts of the State, and more especially in the Southern and Hills Districts, where climatic conditions are very suited to the production and marketing of a perishable product such as eggs. There are, however, other parts of the State—especially where marketing facilities are available—that offer opportunities for the further development of the poultry industry.

In reading this paper the fact should be kept in mind that it is written from the point of view of poultry being kept as a side line to general farming, and not as a sole means of livelihood.

It appears that to a large extent, the greater extension of the industry from a commercial egg producing aspect, will come from the farming areas.

This is an economic factor which must be given serious consideration. In the last few years a marked expansion has taken place in the rearing and keeping of large numbers of poultry in the suburban areas, and while, no doubt, this can be attributed to the depression, people with a block or two of land in the suburban areas have undertaken the keeping of poultry in order to obtain some return. We are, however, concerned to-day with reducing costs of production to the minimum, as South Australia in particular, with its large surplus production is fighting on a competitive method for the existence of the industry. The average farmer has distinct advantages over the suburban producer in production costs. The land necessary for the keeping of poultry is available on the average farm, the cost of feeding is also reduced to the minimum, as practically all the foodstuffs necessary for the production of eggs are grown on the farm. This is a distinct advantage as the suburban man has to buy ali necessary foodstuffs, and in districts where water supplies are available, and suitable for the growing of green-fodders, there is no reason why eggs of the highest quality cannot be produced on the average farm.

OCCUPATION FOR YOUTHS.

There is another important aspect that should be considered, and that is the possibility of the employment of the younger generations on the farm. This factor is puzzling the minds of the majority of parents, and I believe that where boys and girls show any inclination towards the

care of poultry, they should be given the opportunity of extending their knowledge in order that they can, with a reasonable amount of safety, extend the numbers of their poultry.

The Education Department is doing good work in this direction under the Home Project Clubs and already there are many boys in various parts of the State who have flocks of several hundreds of birds, and who are obtaining satisfactory returns from them.

In the Egg Laying Competition conducted at Parafield Poultry Station there is a separate section for Home Project Workers, in which twenty-two boys from various parts of the State have birds competing, and it is very pleasing to see that some of the birds are recording excellent scores.

REQUIREMENTS OF THE MARKET.

There is one all important factor that should be very carefully studied before any definite effort is made in the poultry industry, and that is the requirements of the market. Producing eggs and marketing them continually in a haphazard manner is only courting disaster. The day when an egg, irrespective of the quality, was worth as much as the better quality egg is gone, and unless producers are prepared to give attention to the marketing aspect, they would be well advised not to undertake the keeping of poultry. To argue that it requires special skill, etc., to produce eggs of the quality desired cannot be substantiated. It is barely 12 months ago when the settlers on the Land Settlement Scheme, under the control of the Employment Promotion Council received their first supply of poultry, and very few of these settlers had any previous experience with the keeping of poultry. During the last three months practically 100 per cent. of the eggs marketed by these settlers have passed the grading for export. There have been isolated instances where a few eggs in a case have been rejected, but the percentage rejected compared with the quantities pooled has been infinitesimal.

The overseas exports are under the control of the Department of Commerce, and all eggs submitted for examination are subjected to very close inspection. The regulations state:—

1. "Fresh" in relation to eggs in shell, means that the eggs are fit for human consumption, and are considered by an officer, after examination by the "candling" process, to be not more than seven days old.
2. Any egg, which has a broken or damaged shell, or which is in an unsound, unclean, or other abnormal condition, shall not be packed.

The two principal causes for rejection are—eggs being held too long on the farm before marketing, and so deteriorating in quality; and eggs rejected on account of dirty shells. Both these conditions are such that can be considerably minimised in a large number of cases. There is another aspect that does not receive the attention that it should, and that is our home market or local consumers.

THE LOCAL MARKET.

None of us can close our eyes to the great importance of maintaining quality for export up to the very highest standard, as any slackening in this direction would result in the poultry industry losing the principal

market for our surplus production, but this is no reason why dirty shelled eggs, eggs of poor quality, etc., should be foisted on our local consumers. There are no statistics available concerning the average consumption of eggs in this State, but from what one frequently sees exposed for sale as eggs, the probabilities are that the consumption is not very high In fact during certain months of the year frequent requests are received by the Department enquiring where eggs of good quality can be obtained. If the annual consumption of eggs in the State were increased only by a dozen per head, the increase would be equal to some 580,000doz., and this should be easily attained if the public were assured of buying eggs which were not only attractive in the condition of the shell, but also of good quality, without the combination of egg and chicken in the shell, as is frequently experienced.

THE ADVANTAGE OF THE INFERTILE EGG.

In a climate like South Australia, the advantage of the infertile egg as a marketable product cannot be over-stressed. It should be kept in mind by all producers that in addition to overseas exports, South Australia sells annually interstate approximately 1,000,000doz. as eggs in the shell, and as interstate eggs travel under ordinary conditions without refrigeration, the value of the infertile egg is evident. Germination of the embryo of a fertile egg commences at a temperature of approximately 70deg., and when it is realised that the bulk of country eggs are produced when the temperatures are anything from 80deg. to 100deg., the enormous loss in quality of the eggs can readily be understood.

In addition there are considerations such as the extra amount of food consumed by the surplus cockerels, and the amount of housing accommodation they occupy, which could be more profitably used by the pullets and hens.

In considering the question of keeping poultry on the farm, I will now attempt to indicate the methods along which we should proceed. I believe that the principal factor to be considered is the extent to which a side line can be handled on the farm without interfering with the more important work of the holding. Generally speaking, however, the women folk give most attention to the poultry on the farm, and this fact therefore counteracts the belief that the keeping of poultry on the farm is more or less a drag on the farmer himself.

The question, however, that must be kept in view is that of marketing, and in order to obtain the best returns it is essential that the eggs be marketed twice a week during the summer months, and in order to make this economically possible sufficient birds should be kept so that a case of eggs can be marketed at one time from three hundred to four hundred birds.

REPLACEMENT OF FLOCKS.

Another aspect which should be understood is that in order to ensure a regular return from the flock, replacements of a percentage of the flock are necessary each year. It is suggested that if a flock of three hundred birds are kept, thirty per cent. of them should be replaced each year; if this plan is followed, it will be possible to have a fairly regular supply of eggs each month of the year. It is very doubtful whether any bird after three laying seasons is worth keeping for the production of eggs

only. There are, however, exceptions to this practice, where special birds can be kept for breeding purposes for a season or two longer. On the majority of farms one frequently hears that during the months of April and May there is a shortage of eggs, even for the household. This is due to the fact that the old stock are moulting, and that no young stock have been reared to come into production during the winter months, and until producers in general realise that pullets are the only class of stock that will lay any number of eggs during the winter months, a shortage of eggs during that period will continue.

IMPROVEMENT OF STANDARD OF FLOCKS.

The general standard of farm poultry in this State to-day is not very high. All ages of birds, both males and females, can be seen running together, and it is rather difficult to suggest just where to commence in the rebuilding of a better class of stock. The better course in the majority of districts would be to commence with fresh lines of stock, keep them separate, and gradually dispose of the present stock. With the little attention that has been given to the breeding of farm poultry, it is difficult to suggest any other course; flocks have been running together for many years, and have been continually bred from, without much attention being given to the selection of the breeding stock—a method which is not likely to improve the standard. There are probably many thousands of poultry running on our farms to-day that are only laying a few eggs a year, and this is likely to continue unless the present methods are altered. The principles in poultry keeping that should be understood are—the first laying season is the most profitable one, in the second season the birds that have been proved the best layers in the first season should be used as breeders, and a portion of only the very best of them retained for the third season. No birds over three years of age should therefore be retained. The question of selection of stock is not a difficult one. There are numerous breeders of high class poultry in the State, and a start could be made with the purchase of a breeding pen or two, the purchase of fertile eggs for incubation, or the purchase of day old chicks, or the purchase of pullets at from eight to ten weeks of age, when the risk of rearing same is practically eliminated. Where fertile eggs or day old chicks are purchased there is always the risk of losses in rearing which must be considered, and unless reasonable facilities are available, these losses will frequently be heavy.

The question of breed is one that rests almost entirely with the farmer himself, but in any case the selection of breeds is not very wide. Up to the present time the production of eggs has been specialised in this State, and it appears the right course to continue. This being the case, the choice of birds is limited practically to the White Leghorns, Black Minorcas, Black Orpingtons, and Rhode Island Reds. The capabilities of the Leghorns and the Minorcas are too well-known to require further explanation. Where the dual purpose bird is required, the Black Orpington or Rhode Island Red should supply the needs, with a preference for the latter because when the overseas export of table poultry is re-established, the Rhode Island Red will be the more suitable bird. In any case it is very doubtful whether the export of the Black Orpington as a table bird is advisable, owing to the prejudice on the English market against a bird with black legs.

Whatever breed is decided on, efforts should be made to commence with only the best stock, the aim of which should be the production of the maximum number of 2oz. eggs and over. This is of the greatest concern, as no stock that does not produce the full sized egg should be used for breeding. This necessitates keeping the size of the bird up to standard, because, generally speaking, as the size of the breed deteriorates so does the size of the egg as well as the general constitution of the stock, thus making hatching and rearing more difficult.

TABLE POULTRY.

To those contemplating specialising in the production of table poultry; and there is undoubtedly room for more attention in this direction from the local market point of view; a few points may be of interest. The general demand to-day is for the medium-sized bird; one that dresses at from 3½lbs. to 4lbs. The aim should be to get this weight as quickly as possible, and it should be attainable with any of the principal heavy breeds at from 5 to 5½ months of age. It should be recognised at first that birds will not fatten readily if allowed unlimited free range, as they lose a good deal of condition by the constant foraging and running about on range. The ideal method is to give them range as the frame of the bird develops, until they are from 3½ to 4 months of age. They should then be confined to small coops or batteries each to accommodate from six to eight birds. These batteries can be cheaply constructed from wire-netting and light timber, a design of which can be seen at Parafield Poultry Station. Mash is fed two or three times a day. It is only necessary to hold the birds for three and four weeks at the longest in the battery, and it will be found that the birds will put on from 1lb. to 1½lbs. during this period.

HATCHING MONTHS.

For either egg production or table purposes the hatching periods should be limited to certain months. This practice is difficult to adopt where reliance on the broody hen as a method of hatching is necessary, but with modern methods of hatching by the latest all-electric mammoth incubators, the cost of hatching is comparatively cheap. There are several of these hatcheries in the State and the benefits of seasonable hatchings cannot be too strongly stressed. Similar to the majority of other lines of production the early stock are to be preferred to the late stock, especially in the hotter districts. The advantages of rearing the young stock on early grasses are not fully recognised, whereas with the late stock—October and November hatchings—the succulence of the natural grasses is practically lost and the stock, instead of having free access to abundance of young and tender grasses, are limited to dried-off fields, with the result that they are slower in maturing, and, owing principally to the absence of green feed, do not come into production until June or July. A good practice is to start hatching operations early in July, according to the district and breeds kept, and finish hatching by the end of September. Early September hatching, however, is probably the ideal for most parts of the State. If it is desired to have two hatching seasons in the year, I would advocate also hatching during the latter part of January and through February.

HOUSING.

The method of housing is also worthy of consideration. As mentioned previously in this paper, one of the principal causes for rejects from export is the dirty-shelled egg, and this factor is one closely allied with housing and nesting. If the habits of poultry are closely studied, it

will be found that 70 to 80 per cent. of the eggs produced are laid by noon to 1 o'clock. therefore if the houses are built sufficiently large and sufficient nests provided the number of dirty-shelled eggs will be greatly reduced. Approximately four square feet of floor space should be allowed for each bird. The houses should face north or a little east of north, and it will be found that a hundred birds in one flock will probably give the best results.

One nest to every six birds or sixteen nests to the hundred birds will be sufficient. Two to three inches of clean sand or shell grit should be kept in the nests. This is preferred to straw or cocky chaff, as sand or shell grit do not stain the shell of the egg to the same extent as do straw and cocky chaff. If the nests are kept from 15in. to 18in. above the floor they will help to keep the eggs clean. On the average farm where straw is available about 6ins. of straw should be kept on the floor of the house, except under the perches, where sand should be provided. When choosing a site for the poultry-house select one that is dry, as it is important that the floors should be kept dry. It will be found that if the floor of the house is first levelled and rammed hard, and 1in. wire-netting pegged down on the ground, with the litter placed on the wire netting, it will help to keep the litter dry and also prevent the birds from working big holes in the floor.

The perches should be arranged so that they are not suspended from the roof or fixed to any part of the walls or ends, especially where there is any danger of poultry tick, and a clear space of at least 1ft. between the perches and walls of the houses should be allowed. The perches should be of 3in. x 2in. timber rounded on one 2in. surface; 8in. of perching space should be allowed per bird, and the perches should be from 12in. to 14in. apart, and from 15in. to 18in. high, keeping them all on the one level.

FEEDING.

This is an all-important question, as no matter what the breeding of the stock may be, unless they are properly fed the results will not be satisfactory. Continued feeding experiments have been conducted at Parafield Poultry Station to obtain data as to the most suitable methods that could be adopted, keeping in mind the particular foodstuffs that were available on the average farm. For a number of years it has been considered that for the profitable production of eggs the feeding of both bran and pollard was essential, and while not in the least depreciating the value of bran and pollard as a poultry food, it was not an economic practice for the average farmer, especially in districts where mill offal was difficult to obtain, to feed bran and pollard if other suitable foodstuffs were available on the farm. There are two aspects, however, to be considered and that is feeding solely for egg production and feeding for breeding, and I would definitely state that the conclusions to be given are only from an egg-producing point of view. Experiments in regard to the effects of the various methods of feeding on fertility and hatchability are still in progress. It is recognised that the principal foodstuffs available on the farms are wheat and barley, and a ration which has given very favourable results is—

Morning—Wet mash, composed of 1 part crushed barley, 2 parts wholemeal by weight, 1lb. meat meal per 100 birds, 50 per cent. chopped greenfeed.

Mid-day—Wheat.

Night—Wheat.

Where it has not been practicable to feed a wet mash, the same mixture of meals and meat meal, mixed dry and fed in hoppers, has also given satisfactory results. The basis of quantity per bird a day is crushed barley ½oz., wholemeal 1oz., wheat 2ozs.

A very interesting comparison of the difference in production of the above methods to those adopted by the ordinary farmer, that is, of feeding wheat night and morning, is shown by the production of the same number of birds in each pen, that is 50 birds, over a period of sixteen months:—

	Number eggs laid.
Wet mash pen	8,864
Dry mash pen	8,237
Wheat pen	4,217

The Wet Mash pen laid more than double the number of eggs of the pen fed on all wheat as a grain.

THE BAROMETER OF THE POULTRY INDUSTRY.

The following figures supplied by the Government Statist reveal the growth of the poultry livestock of the State during the last four years:—

Year 1929-30	1,665,818 head
1930-31	1,759,054 "
1931-32	2,033,512 "
1932-33	2,109,592 "

The overseas exports of eggs in shell from South Australia for corresponding years are also very illuminating:—

Year 1930	772,680 dozens
1931	1,961,400 "
1932	3,702,450 "
1933	4.181,640 "

It is believed that there is still room for increased production of poultry and eggs in the wheat-growing areas of this State, and if the general advice given in this paper is closely followed, the poultry industry will still increase in production and hold the position of one of the most important primary industries of this State.

INDIGESTION IN FOALS.

"Narridy" reports foals two months old eating dirt and manure. This question was referred to Mr. A. H. Robin, B.V.Sc., of the Stock and Brands Department, who says the indications are those of indigestion. The commonest cause of this trouble in suckling foals is some trouble with the mare that renders her milk indigestible; overworking or overheating of the mare will also cause her milk to have the effect of upsetting the foal. It would be advisable in such cases to give the foal a drench of ¼ pint of olive or raw linseed oil, and at the same time give the mare a drench of raw linseed oil, 1½ pints; oil of turpentine, 4 tablespoons; following this with a heaped tablespoon of baking soda night and morning in damped feed for a few days.

QUALITY OF DAIRY PRODUCE AND ITS EFFECT ON MARKETING CONDITIONS.

[Paper read by H. B. Barlow, H.D.A. (Chief Dairy Instructor), at the Forty-fifth Congress of the Agricultural Bureau.]

In discussing this question I am thinking particularly of the chief product of the dairying industry, namely, butter, but at the same time the position of cheese, condensed milk, and even liquid milk must not be overlooked.

Anyone who takes a long-sighted view of the matter must of necessity admit that high-quality products always control a much readier market than shoddy or inferior goods, and this fact should always be kept well in mind when considering the marketing of our dairy produce to the best advantage either locally or on an overseas market.

The butter production of South Australia for the years 1931-1934 was as follows:—

	1931-32.	1932-33.	1933-34.
Factory butter	13,828,764lbs.	17,161,664lbs.	15,189,656lbs.
Dairy butter	3,834,265lbs.	4,148,342lbs.	4,426,388lbs.
Exports	7,400,628lbs.	9,500,027lbs.	8,308,420lbs.

Percentage of Grades.

	Boxes.	Boxes.	Boxes.
Choice grade	37,379 = 27.25%	50,770 = 29.16%	43,872 = 27.33%
First grade	68,777 = 50.69%	101,331 = 58.20%	93,627 = 58.34%
Second grade	26,036 = 19.19%	16,790 = 9.63%	14,097 = 8.78%
Pastry grade	3,600 = 2.60%	5,214 = 2.99%	8,884 = 5.53%

Local consumption is estimated at about 20lbs of butter per head which, with a population of 580,000, represents a consumption of about 11,600,000lbs. per year.

An estimation of the quality of the butter consumed locally, without taking dairy butter into consideration, would be about 30 per cent. Choice Quality, 50 per cent. good First Grade, and 20 per cent. Second Grade.

The estimated per capita consumption of butter in Australia is about 27lbs. per head, and the per capita consumption in New South Wales is about 31-32lbs. per head, and represents about 41 per cent. of the total consumption in Australia.

In considering these figures it is probably advisable to point out that good First Grade and Choice butters only are suitable for table use. On this basis it is apparent that not more than 75 per cent. of our factory butter is fit for table use, barely 30 per cent. of this butter is of Choice quality, and it is doubtful if 50 per cent. of farm butter could be classed as even First Grade, and practically no farm butter could be designated Choice Grade.

From these figures it would appear than in South Australia we are, generally speaking, supplying our local consumers, who after all are our best and most valuable customers, with a mediocre article. It might be suggested, why stress this fact as long as the consumers will buy our product? It is definitely a fact that it is cheaper and easier to make a mediocre article than a high quality product, but does the small saving obtained by this short-sighted policy in any way compensate us for the financial loss which occurs to the producer and the State generally?

As a matter of comparison let us consider the comparative position in New South Wales. It is estimated that in New South Wales approximately 85 per cent. of the butter manufactured is of Choice Grade, or of the very highest quality, and the per capita consumption is 31-32lbs. per head of population. During the last 20 years the quality of butter manufactured in New South Wales has been gradually improving in quality, and during this period—at least up to the start of the so-called "depression"—the per capita consumption gradually increased, and moreover this increase was brought about, not by costly schemes of advertising, etc., but simply by educating the general public's taste for a high-grade butter, and on account of the improved palatability increasing the consumption enormously. Figures from other States could be quoted which definitely prove that the better the quality of butter supplied the greater does the per capita consumption become.

From the point of view of the Commonwealth it is doubtful whether increased per capita consumption would be a direct advantage since an increase of 5lbs. per head in consumption would tend to lower our exportable surplus by about 30,000,000lbs. per year, but from the point of view of the producers the added income would be a very valuable consideration. Consider the position as it is to-day and has been for some years throughout Australia. The price paid by consumers for butter in Australia is in the vicinity of 140s. per cwt., and the value of the same butter in London is only about 70s. per cwt.

Taking these figures into consideration it is very easy to conceive what a great advantage it would be to all producers in South Australia if we could raise our per capita consumption to even slightly below that of New South Wales, which would mean an approximate increase of about 10lbs. per capita. With a population of 580,000 this would give us a total consumption of 17,400,000lbs. out of a total production (including farm butter) of 19,616,044lbs., or in other words our producers would be credited with the high Australian price for all the table butter made in the State instead of only about 60 per cent. as at present.

There is no doubt in my mind that, if not wholly at least in part, it is possible for us to realise this improvement, but it cannot be done without a really conscientious endeavour being made by all concerned. I do not for a moment wish to infer that the mediocre quality of our butter as a whole is due solely to laxity on the part of the producer, but we cannot afford to forget the fact that good quality cream is the basis of high quality butter.

It is only necessary to go on the cream-receiving platforms of factories to realise what mixed ideas producers seem to have of a suitable cream for butter making. You will see cream testing as low as 30 per cent. and up as high as 60 per cent. of butterfat—varying in age, acidity, smells, flavours, temperatures, and physical condition! Cream too thin containing coagulated curd, creams so thick that they are with difficulty removed from the cans, and unmixed creams showing a different layer for each separation. Some of the creams are contaminated from unwashed separators or partly washed milking machines and utensils, and suppliers expect factories to produce choice butter from them all.

Given good clean cream, cared for and delivered by the farmers as it should be, it would be difficult to make butter in the average modern factory below choicest quality by standardised methods, but it is very difficult to make even passably good butter from inferior cream in the very best factories and with highly trained operatives.

There is no doubt that the initial cause of so much mediocre butter being made in South Australia is the fact that a large percentage of the cream delivered to the factories is of inferior quality, and to a great extent the factories, by what is called competition, foster this mediocre supply Because of this competition factory managers have been induced to mix inferior creams with choicest creams, thereby lowering the average quality and spoiling the market for their goods. To try and avoid grading cream and paying for quality factories have spent thousands of pounds on costly equipment, and have been experimenting with various processes of neutralising, pasteurising, and deoderising in a way that was never intended in order to try to do the impossible, that is, make good butter from bad cream. Surely the producer of South Australia is not going to admit that unless his cream is renovated it is not suitable for making good butter?

I have tried to indicate that in my opinion an improvement in the quality of our table butters can be expected practically for certain to have a direct effect on our per capita consumption with a corresponding increase in financial returns. Besides being true with regard to our local market it is only reasonable to expect that an improvement in the general quality of our Australian butter would show a definite improvement in price levels. Although it is usually stated that there are only a few shillings difference between the export parity of our good and inferior butters, the value of a higher quality is illustrated by the fact that certain Australian brands of butter which consistently grade high points for flavour obtain a price premium over other Australian Choice brands in London, showing that consistent high quality does have an effect on the financial returns.

I have brought this matter up for discussion because in my opinion the marketing legislation recently adopted in Australia, although it will definitely tend to stabilise the price of good butter, might, in my opinion, have the ultimate effect of tending to increase the margin of values, good quality, and lower grade of produce. If this is so, South Australia, with a relatively high percentage of inferior butter may ultimately be at a disadvantage as compared with the Eastern States unless we make every endeavour possible to decrease our percentage of inferior produce.

THE PRODUCTION OF FAT LAMBS.

[Paper submitted by MR. T. R. SECKER (Yalluna Station, Tumby Bay), at the Forty-fifth Congress of the Agricultural Bureau.]

It is generally recognised nowadays that wheatfarmers must keep sheep to hope to get full returns from their farms, that the best results are secured by farmers from a breeding flock rather than by dabbling in dealing with sheep, and that where distance to market is not too great and transport facilities are fair, the production of fat lambs gives the farmer a chance of making a greater profit than does breeding for wool alone. This has proved so for a long time where farmers are not more than 150 miles or so from the Adelaide market, and of recent times similar results are being realised for Eyre's Peninsula since the Port Lincoln Freezing Works have been opened each season for the slaughtering and exporting of fat lambs.

The climatic conditions, and the requirements of the overseas market are the deciding factors in deciding which type of fat lamb will prove most profitable, and fortunately sufficient experience has been had in the State to know that the relatively short, dumpy, broad-backed lamb, with well-filled hindquarters, the dressed carcass of which weighs from 32lbs. to 36lbs., as required by the British market, can be produced with certainty in many districts of South Australia, and certainly so in southern Eyre's Peninsula.

The type of ewe to produce the desired lamb, and at the same time give a reasonable return for her fleece will vary according to circumstances, but if export lambs are the aim the choice of ram is strictly limited.

THE MOTHER OF THE FAT LAMB.

In some districts farmers have no choice but to use Merino ewes as the mothers of the fat lambs—at all events when they commence this form of sheep management—but in many cases this will be altered as time goes on. On Eyre's Peninsula, Merino ewes are now on many farms, or at all events they can be readily procured, whereas some difficulty would be experienced in securing crossbred ewes of any type suitable for producing fat lambs.

MERINO EWES.

If Merino ewes are to be used, select big-framed, robust ewes from 6-tooth to 5 years old, which as a rule will give bigger lambs, a better percentage of lambs, and will look after the lambs better than will 4-tooth maiden ewes. Such ewes will also give a good wool return.

These Merino ewes should be mated to one of the Downs breeds of rams, say, about the middle of December for southern Eyre's Peninsula. At least two rams to every 100 ewes are needed to ensure an even drop and they should be left in for a period of eight weeks. The lambs should start to come along about the middle of May, which is early enough as there is then a better chance of having some green picking than if lambed earlier. Some farmers prefer to have their lambing all over before cold weather sets in; if so, then the ewes will have to be mated earlier. There is this danger in having the lambs too early, they are likely to receive a severe check which takes a lot of making up again. Lambs which have been severely checked never make the lambs they would if they had not received this setback early in their lives.

The Merino ewe has the big advantage that she will mate any time, which is not the case with most crossbred ewes.

CROSSBRED EWES.

Crossbred ewes are far bigger framed than the Merinos, have a better milk supply, and give a bigger and quicker growing lamb. But some of the crosses will not mate perhaps as early as one may desire and mate better in the latter end of January and during February.

The Corriedale-Merino crossbred ewe will mate earlier than most of the other crossbreds, and seems to be an ideal ewe for fat lamb raising in our agricultural areas. She is a splendid mother, has great constitution, cuts a valuable fleece of wool, and when finished for breeding will readily fatten and command good money. Another point that cannot be lost sight of, with perhaps uncertain markets, is that the Corriedale-Merino crossbred ewe has a big advantage over other crossbred ewes for if, at any time, one wishes to go back to wool growing alone one has a ewe that will give the quickest and best results.

THE RAM TO SIRE THE FAT LAMB.

The Corriedale ram crossed on the Merino ewe gives a very nice lamb, but has a bit too much leg, and therefore not a really good export lamb, still, by keeping the ewe lambs of this cross as future breeders to be mated with a Southdown sire, seems to give pretty near the ideal lamb.

The favourite is the Southdown as a sire for fat lambs for export, from either Merino or crossbred ewes. No individual ram, in a sense, is too good for this job. The dearer class of ram is far the better to use, and it is noticeable that he is generally very short in the scrag, broader in brisket, wide across the shoulders, has well-sprung ribs—in fact the same width from shoulder to tail—and better filled-in in the breech and carrying the leg fairly full to the hock, giving a ham-like leg, and is well worth the extra money asked as against the cheaper-priced ram.

The Ryeland ram was tried as a sire for the first time this season at Yeelanna, crossed with Corriedale-Merino crossbred ewes. These lambs are very promising, and have grown quickly in spite of the unfavourable start to the season. These lambs are very much like the Southdown in shape, but larger, and carry more bone, and it appears that they would have to be marketed as soon as ready or they would quickly get on the heavy side. The use of this ram for crossing is likely to become more general and should prove profitable.

FEEDING THE FLOCK.

One of the main things helping towards success is feeding the flock, and this plays a very important part. The ewes should be in good condition when mated and kept so right up to lambing time, and if sufficient feed is not available in the paddocks hand-feeding should be resorted to. A couple of stubble paddocks should be seeded with a combine in the early autumn with fodders for feed. A good mixture is 40 lbs. of barley, 2lbs. Giant Kangaroo rape, and 50lbs. of super to the acre for one paddock, and 40lbs. of Mulga oats, 2lbs. of Wimmera Rye Grass, and 50lbs. of super to the acre for the other, especially if the latter one is to be left out for three or four years, as the Wimmera Rye Grass will give good grazing during this period.

Any sheepman knows that sheep do better if changed often on to fresh and different kinds of feeds, and this holds good in growing fat lambs. Having paddocks reasonably small helps considerably to this end.

Every farmer on the cleared areas of southern Eyre's Peninsula, especially from Lock south, should breed some fat lambs. The freezers at Port Lincoln are conducted for the benefit of primary producers, and as Mr. McCann (the Trade Commissioner) informed local settlers, the lambs exported to Britain from Port Lincoln were now a wonderful colour and a credit to the producers, and it is up to sheep breeders to patronise the freezers more, as the greater the number of lambs sent in so will the overhead expenses of exporting them be smaller. Further, the money received from fat lambs is particularly helpful as it comes at a time when other returns from the farm are small.

HANDLING THE LAMBS.

After growing the lambs a very important thing is the correct handling of them. If they are to be drafted from the flock through a race great care should be taken not to jam the lambs with the gate, and sticks should not be used to poke them through. A great number of lambs are badly bruised by rough handling during drafting. If no drafting race is available the lambs should be caught by putting

the arms around them at the brisket when they can be lifted easily without any chance of bruising or injuring them in any way. A lamb should never be caught by the wool or by a leg, as the former will always bruise, and the latter may seriously injure the animal. Bruised or injured lambs mean rejects at the slaughterhouse and consequently less money returns, and so careful handling is a paying proposition.

CONCLUSIONS.

1. Have good, roomy ewes as breeders.
2. Select only the best type of rams as sires.
3. Grow plenty of feed.
4. Feed the sheep well.
5. Change the sheep from paddock to paddock frequently.
6. Always handle lambs carefully.

Close adherence to these rules *must* lead to success.

SOME PREVENTABLE DISEASES OF PIGS.

[Paper read by A. H. Robin, B.V.Sc. (Government Veterinary Officer), at the Forty-fifth Congress of the Agricultural Bureau.]

A tremendous number of young pigs that are born never survive to reach the market, and the loss of animals through disease is the greatest factor militating against profitable pig raising. In this paper, some of the diseases that frequently cause heavy losses in this State are dealt with.

DIARRHOEA OR WHITE SCOUR.

Suckling pigs a few days old frequently become affected with a form of diarrhoea or white scour which results in their death within a day or two of its onset or, if the little pigs survive, causes them to receive a severe setback in their growth.

One of the most common causes of this trouble is too generous feeding of the sow prior to and immediately after farrowing, as the result of which the little pigs get more milk than their digestive organs can deal with. Sudden changes in the sow's diet will cause it, as also will the existence of insanitary conditions in the sties as the result of which, through contamination of the sow's udder, countless filth organisms are swallowed down by the youngsters when suckling.

The prevention of the trouble consists in proper management of the sow and keeping the sties in a clean and sanitary condition. The sow should not be permitted to get into fat condition, and while her diet should be sufficient and varied with due proportion of flesh and bone forming elements, it should not contain excessive amounts of protein. The feeding of protein should be reduced for a week or ten days prior to farrowing, and when the sow has been put into the pen in readiness for that event, her diet should be laxative in character. No food should be given for 24 hours after farrowing, though water *ad lib* should be provided. Subsequently the feed given should be light for a day or two and then gradually increased during the next 7 to 10 days after which a full ration can be fed. Sudden changes in the diet should be avoided. The sty should be kept clean and the sow's udder as free as possible from contamination by filth.

Treatment of the trouble when it occurs consists of reducing the feeding of the sow for a few days and giving the affected suckers each a teaspoonful of castor or olive oil. The sow's udder can be smeared with a solution of citrate of iron or the following mixture given to the suckers:—Sulphate of iron, 3 drams; sulphate of copper, 1 dram; water, 1 pint. Dose, 1 teaspoonful. Turning the sow and litter out on to pasture during portion of the day will often prove beneficial in checking the trouble.

NUTRITIONAL ANAEMIA OF SUCKLING PIGS.

It not infrequently happens that suckling pigs when confined all the time to sties while living exclusively on their mother's milk, suddenly at the age of 3 to 4 weeks, start to "go back," although previously they appeared to be thriving quite normally. They become pale and listless, sudden deaths may occur among them, or instead of growing on as they should, they become stunted, unhealthy and short of breath. More or less severe diarrhoea or scour often supervenes, the skin becomes mottled and unhealthy in appearance and death not infrequently results after the little animals have become emaciated and miserable looking.

This trouble is one of anaemia due to a lack of iron, and it is more particularly likely to arise if the sow throughout her pregnancy has been confined to the sty and inadequately fed.

Its prevention lies in suitable management of the sow while "in pig" and of the sow and litter after farrowing. Normally the embryo pig, during the process of its development "in utero," stores in its liver a supply of iron received from the mother in order to meet its requirements for this mineral during the suckling period, as sow's milk is almost lacking in the iron that is so necessary for the formation of blood in the young growing pig. If the sow is kept continuously confined to the sty during pregnancy and is deprived of the opportunity of obtaining iron from the soil or from green feed, there is every possibility that she will not be able to hand on to the embryonic pigs a supply sufficient for their requirements. She should therefore be allowed regular access to pasture so that she can obtain ample supplies of this mineral or if she has to be kept confined, be given a regular allowance of green feed as well as a supply of ashes and earth. Subsequently after farrowing has taken place, access to clean pastures for at least 2 or 3 hours daily should be afforded to both her and her litter from the time that the little pigs are 10 days old.

Should this trouble make its appearance in any litter of young pigs, the simplest and most effective curative treatment is to turn the sow and her pigs out on to clean pasture immediately. The young pigs will at once begin to root in the earth and eat it and in this way obtain the necessary supplies of iron to restore them to health. The trouble can also be dealt with by drug treatment, giving the young pigs 1 dram doses of Parrish's Food daily for 2 or 3 days, or 3 to 6 grains of either Ferri Carb. Sacch., or Ferri Ammon. Cit., but the individual dosing of a number of young pigs daily is a troublesome and less practical matter.

CONTAGIOUS PNEUMONIA (SWINE PLAGUE).

Outbreaks of a highly infectious form of pneumonia occur at times in piggeries, occasioning heavy mortalities among the animals. The organism responsible is the *Bacillus suisepticus*, which is quite a common inhabitant of the lung tissues of apparently healthy pigs and becomes activated as the result of some sudden lowering of the animal's vitality. Exposure to cold draughts, wet weather, irregular feeding, sudden changes of diet, and the transportation of the animals from one place to another are all factors that may act as predisposing causes, reducing the vitality of the animals and enabling the organism to set up the disease if present in the lungs. Accordingly, pigs which have been exposed in the saleyards and have to contend with such factors as those mentioned are particularly liable to contract the disease and spread it in a virulent form when introduced into fresh premises.

The symptoms of contagious pneumonia vary. In very acute cases the animals show high fever, loss of appetite, staggering gait, respiratory distress, and death occurs in 12 to 24 hours. In less acute cases, the animals survive longer, showing all the signs of acute pneumonia, viz., laboured breathing, cough, nasal discharge, and depression. Red blotching of the skin occurs and sometimes diarrhoea. Examination of a pig dead of the disease may show very little beyond numerous small haemorrhages throughout the body, if death supervened within a few hours. In cases where the animal was ill for longer than 24 hours, solid dark-coloured areas in the lungs are always present and the lining of the stomach and small intestines may be red and inflamed.

The prevention of this disease is largely a matter of maintaining good hygiene and sanitation of the pig premises—the animals' quarters should be dry, clean, warm, and free from draughts, and they should be regularly fed.

Particular care should always be taken to isolate newly purchased pigs for 10 to 14 days to make sure that they are not affected with the trouble. Nothing can be done in the treatment of affected animals, though all such should be isolated immediately they are noticed sick. Carcasses of dead animals should be effectively disposed of.

The disease is a notifiable one under the Stock Diseases Act, South Australia, and, on its occurrence or suspected occurrence, the nearest Stock Inspector or the Chief Inspector of Stock, Adelaide, must be immediately notified. A history of a number of animals being affected with pneumonia following the introduction of newly purchased pigs is very suggestive.

LICE.

Infestation with lice (*Haematopinus Suis*) is a very prevalent trouble in pigs in this State and should be controlled more than it often is. This pig parasite is the largest of all animal lice and causes intense irritation to animals infested with it, resulting in their losing condition seriously and suffering from various forms of skin trouble, such as eczema, &c. It is a blood sucker and the vitality of the pigs is often so reduced that they fall prey to other diseases of a fatal nature. Dark, dirty sheds and sties and badly drained yards are favourite breeding grounds for the parasite.

There is no difficulty in detecting the lice on inspection of the animals, favourite sites on the body being the grooves or folds of skin behind the ears and on the inner surface of the hind legs.

Treatment consists of the application of dressings to the pig's skin for the destruction of the lice and nits and the cleaning up of the sheds and sties. Where large numbers of animals have to be dealt with, they can be put through a dip in the same manner as sheep are dealt with. Any non-poisonous sheep dip preparation can be used, or solutions of any of the coal tar derivatives such as lysol, creolin, &c. The strength of the solution should be ½ per cent. or 1gall. of dip preparation to 50galls. of water.

A preparation of kerosene, 2ozs., raw linseed oil, 1 pint, can be used to dress the pigs, applying the mixture with a brush or cloth, or kerosene emulsion may be used. This is prepared by cutting up 8ozs. of soap and dissolving it in hot water. When boiling, stir in well 2galls. of kerosene and keep stirring until the solution is cool. Add 1gall. of this emulsion to 8galls. of water and spray or wash the animals with it. The only precaution to take in using these mixtures containing kerosene is not to apply them during the heat of the day, else the pigs are liable to be scalded. Apply them in the cool of the evening.

Waste engine oil is also a very effective dressing. One of the simplest ways of dealing with the parasite is to allow the pigs to oil themselves by providing them with a rubbing post, wrapped round with sacking which is kept soaked with the oil. The pigs will scratch themselves on the post and the oil will thus saturate the hair and destroy the lice.

All infested sties and sheds should be thoroughly cleansed, disinfected, and lime washed, and all litter, bedding, and manure burned.

ASCARIASIS OR ROUND WORM INFESTATION.

The Round worm *Ascaris lumbricoides* (*Suilla*) is undoubtedly the most widespread and serious trouble met with in pigs in this State. While older animals are much more resistant to infestation with it, this parasite is particularly injurious to young pigs up to the age of about 4 months, and not only does it cause the deaths of large numbers of them here every year, but a great many more that do not actually succumb to the infestation have their growth so retarded that it is impossible for them to be got into marketable condition sufficiently quickly to make them at all profitable to their owners.

Because of the serious losses it causes to pig raisers here, I have devoted a considerable portion of this paper to dealing with it.

The adult worm is from 6in. to 12in. in length and from $\frac{1}{8}$in. to $\frac{1}{4}$in. in diameter, and is whitish in colour and pointed at both ends. Its habitat is the small intestine of the pig, and here at times hundreds of them may be found present. Occasionally it may be found in the stomach or invading the bile ducts of the liver.

Pigs become infested through ingestion (or swallowing) of eggs containing infective embryo worms. Young sucking pigs frequently swallow such eggs which become adherent with dirt, &c., to the sow's udder; older pigs usually swallow them along with the food and drinking water.

The life history of the *Ascaris* is a remarkable and particularly interesting one, and is well worth pig owners understanding it. Briefly, it is as follows:— The eggs are laid in the pig's intestine by the mature female worm, and are passed out with the animal's dung. They are not infective immediately they leave the animal, but require up to several weeks lying on the moist warm ground to "ripen" or develop into this stage, when a tiny embryo worm has developed inside the shell. These embryos do not hatch out of the shell until the eggs are swallowed by susceptible animals, and the eggs are particularly resistant to unfavourable climatic conditions (such as drought, frost, &c.) and to strong disinfectant solutions, and can remain dormant on the ground for, it is stated, as long as 5 to 7 years and then still be capable of developing into adult worms if swallowed by pigs.

When the "ripe" or infective egg is swallowed the shell is dissolved in the pig's intestine and the embryo worms set free. Then a remarkable migration takes place. They at once burrow into the intestinal wall, and so reach the blood and lymphatic streams in which they are carried, first to the liver and from there, shortly afterwards, to the lungs where they leave the blood stream and pass through the lung tissues into the windpipe, where they undergo some further development. The time taken for the embryos to reach the windpipe after the eggs are first swallowed is usually about 8 to 10 days, though they have been found there as early as 3 days later. It is during this migration of the embryos through the lung tissue and while they are located in the windpipe that infected pigs suffer from coughing, bronchitis, and, not infrequently, pneumonia.

From the windpipe, the young larvae either crawl up or are coughed up into the pig's mouth. They are then swallowed again and so eventually return to the intestine where they develop into the adult stage, which is attained 7 weeks or more after the first swallowing of the eggs.

The clinical symptoms set up in infested animals are somewhat variable owing to the complex life history of the parasite, but the following are the most important:—

(*a*) Young pigs (before or shortly after weaning) will frequently contract a severe and rapidly fatal pneumonia, with symptoms of listlessness, lack of appetite, cough, and difficult breathing—death resulting in from one to several days. Where the degree of infestation is less heavy, the course of their illness is more chronic—the animals do not eat well, lose condition, and become weak and stunted in growth. Fits of coughing are most pronounced. Death may take place within a few weeks or occasionally the coughing may gradually disappear, leaving the animal with a difficult or "thumpy" breathing.

(*b*) Older pigs (weaned a month or two) may sometimes develop the rapidly fatal pneumonia described above (*a*), though more commonly they show the more chronic type of illness. Again, in others, the symptoms may be less definite—the animals failing to "grow on," becoming pot-bellied and thin and weak despite good feeding. Convulsive fits while or shortly after feeding are not uncommon.

(*c*) Older pigs are much more resistant to infestation with the *Ascaris*, harbour fewer worms, and suffer less from the invasion of them, showing nothing more than perhaps some degree of general unthriftiness with an occasional slight cough.

Control Measures.

It is the little pigs up to approximately 4 months old that especially require protection from the *Ascaris*. The measures necessary to afford them this comprise:—

(1) Systematic medicinal treatment of infested animals; and

(2) The establishment of satisfactory sanitary measures to prevent, as far as possible, the animals from swallowing infective eggs lying on the ground, floors of sties, &c.

Many different remedies are tried by pig owners for treatment of infested animals, but most of these are of little or no value or are uncertain. Mass dosage of the animals by mixing in with the food enough of the medicine for a number of pigs is, moreover, the system of dosing usually adopted, but the disadvantages of this style of treatment are obvious, and usually the most heavily-infested animals, owing to their weak condition, will get little or none of the medicine. The only satisfactory way of carrying out the work is by dosing each animal separately—it is certainly rather more laborious, but is infinitely more successful and worth while. Two men, one holding the pig while the other one doses it, should easily be able to get through the job at the rate of a pig per minute.

The most effective and economical drug is Oil of Chenopodium, and the following table sets out doses that are safe and effective:—

Age.	Dose.
	Minims.
8 weeks	20
10 weeks	25
12 weeks	30
14 weeks	35
16 weeks	40
	Fluid Drams.
6 months	1
9 months	1½
12 months and over	2

(1 minim = 1 drop; 1 fluid dram = 1 teaspoonful.)

The dose of Chenopodium is added to a full purgative dose of Castor or Raw Linseed Oil—the dose of either of these being from 1-4 fluid ounces (2 tablespoonsful = 1 fluid ounce) according to size of pig. The mixture is then well shaken up with a little milk, and the whole given as a drench.

The pigs must be starved for 24 hours prior to dosing, and as soon as the purgative has acted they may be given their usual food and water. It should hardly be necessary to point out that they should be keep confined until the medicine has acted so that all worms and manure voided can be collected and properly disposed of.

While dosing the animals will remove most, if not all, the worms they are harbouring, re-infestation of them will promptly take place again if they are allowed to return to egg-contaminated pastures or other quarters. The young pigs should therefore, after dosing, be either removed to a part of the farm where pigs have not previously been running, or if this is impracticable they should be put into clean sties that can be kept regularly and thoroughly cleaned out. These sties should therefore have hard floors of flat stone, bricks, or concrete. If these floors and also the food and water troughs are thoroughly cleaned out every 10-14 days

by the use of water and a hard stable broom, any worm eggs that may happen to be deposited thereon will be removed before they can mature or develop into the infective stage, and in consequence the young pigs will not become re-infested.

If these control measures outlined are carried out, owners who have been experiencing serious trouble and losses in their animals, due to the round worm, will find that these difficulties will very largely disappear so that their work of pig raising can be carried on much more successfully.

A system of control to which I would draw the attention of pig raisers in this State is that known as the McLean County System of Swine Sanitation. This system was evolved by the veterinary staff of the United States Bureau of Animal Industry and thoroughly tested out on a number of farms in the McLean county of Illinois, and it proved so successful in preventing losses from worms that its employment has spread rapidly and continues to do so. There is no reason apparent why it cannot be employed on many farms in this State where *Ascarid* infection is troublesome. The system consists, in essence, of so handling young pigs from the time of birth until the age of several months (that is, during the most susceptible period of their lives) that the chances of their becoming infested is reduced to a minimum.

Two essentials are necessary to the scheme, viz., properly constructed farrowing pens and fresh, clean pastures. The farrowing pens should have impervious floors and walls so that they can be kept thoroughly cleaned, and they should be so situated that it is not possible for drainage from other pigs' quarters to contaminate them. Each time prior to their being used for farrowing purposes, all litter is removed and the floors and walls thoroughly scrubbed with boiling water and washing soda to remove dirt and destroy any worm eggs.

Three or four days before they are due to farrow, the sows have all loose mud and dirt removed from their skins by thorough brushing, and their udders and feet thoroughly washed with soap and warm water. They are then placed in the clean pens. This preliminary cleansing prevents the sows from carrying into the pens perhaps millions of worm eggs picked up with the soil of the pig yards and which the young pigs would be most likely to swallow during the process of suckling.

The sows and their litters are not allowed out of these pens until they are removed to the clean pastures, which is done about 10 days after farrowing. In carrying out this transfer, it is essential that the animals be moved on a specially-constructed sledge or other conveyance; they must not be permitted to walk over ground that has been soiled by other pigs.

The special pasture should be one that has not previously been used for running pigs on; it should be so fenced that the little pigs cannot get out and find their way to other pig paddocks, and no other pigs should be allowed access to it. Its location will depend on the facilities afforded by the farm, but to avoid accidents the further away it can be from the permanent pig runs the better. Water, feed and shelter must, of course, be provided on it for the sows and young pigs and, if possible, each sow and her litter should be kept separate.

The young pigs are kept on this clean pasture until they are at least 4 months old, after which age they are not very highly susceptible to suffer from worm infestation, even though they then be exposed to it. They can then be removed to other paddocks or direct to the finishing pens.

Summarising the system, the steps to be carried out are:—

(1) Remove all litter and thoroughly clean out the farrowing pens with hot water and washing soda.

(2) Three or four days before farrowing, scrub the sow thoroughly with a brush, using soap and warm water to cleanse the udder and feet. Put the sow in the clean pen.

(3) Ten days after farrowing haul—do not drive on the hoof—the sow and her pigs direct from the pen to the clean pasture.
(4) Keep other pigs away from this pasture and the sow and little pigs away from other dirty pig paddocks.
(5) Leave the young pigs on the clean pasture until they are at least 4 months old.

It is advisable to dose the sows with Chenopodium some time when not in farrow so as to get rid of any worms they might be harbouring.

These requirements are quite simple, but each and every one of them is important. Carefully carried out in detail, they will not only enable losses in young pigs from *Ascarids* to be avoided, but they will enable better pigs to be raised. It is interesting to note the records compiled from 154 farms in Illinois, U.S.A., where this system of sanitation was adopted. These showed that apart from the avoidance of losses in numbers due to *Ascarid* infestation, the young pigs were ready for market 7 weeks younger than the usual market age under previous methods of control, and that when 4 months old the pigs raised weighed 28lbs. more on the average than other pigs on the same farms not raised under the system.

MINERALS FOR PIGS.

Mineral matter is of the greatest importance to young growing pigs, being required for the maintenance of vital body functions and the growth of sound bone. It also assists in the building up of the food proteins into muscular and other body tissues. A deficiency of it leads to unthriftiness, poor development, and the occurrence of diseases such as depraved appetite, paralysis, and rickets. So if they are to remain healthy and make rapid growth their diet must contain supplies of it ample for their needs While all feeding stuffs contain various minerals required by pigs, the amounts present vary considerably, *e.g.*, some foods are rich in Calcium, others are poor in it, &c. Should there be any danger, therefore, of the ration supplied being short to any serious extent of the animals' requirements of them, then a mineral supplement should be fed in order to make good the deficiency.

From the practical feeder's point of view the trouble is to know when and in what respects the ration he is feeding to his pigs is likely to be deficient in minerals, and what and how much of mineral supplements he should feed. During recent years the mineral requirements of pigs have received considerable attention from research workers in many countries, and a vast amount of information has been obtained on the subject, from which it is possible to advise on these several points briefly as follows:—

1. The only mineral constituents that are ever likely to be lacking to any serious extent in rations fed ordinarily to pigs from weaning to marketing condition are Calcium (Lime), Phosphates, and Common Salt (Na Cl).

2. Separated milk is rich in all of these, and if the ration includes it to the extent of about ½gall. per pig daily the supply of minerals will be ample, and no mineral supplement need be fed.

3. Cereals and their by-products and vegetable cakes are seriously lacking in Calcium (Lime), though rich in Phosphates; roots and tubers (potatoes, swedes, &c.) are deficient both in Calcium and Phosphates. All of these foods have a low content of Common Salt.

If the major portion of the ration consists of cereals and their by-products, and separated milk is not included, the ration is likely to be deficient in Calcium and Salt, and Salt and a Calcium-rich supplement should be fed.

If roots and tubers are extensively fed, the mineral supplement should contain Phosphates as well.

4. Calcium (lime) may be supplied either in the form of a phosphate (bone meal, dicalcic phosphate), or as ground limestone (calc. carbonate), or agricultural lime.

When cereals predominate in the ration, the latter forms give equally good, if not better, results than the phosphate forms.

Two per cent. of any of the above added to the ration will be ample. Common salt may be fed at the rate of ⅛oz. to ¼oz. per pig daily.

5. If it is desired to provide the necessary minerals in the form of a mixture, either of the two following will fully supply the need:—

(*a*) Ground limestone or agricultural lime, 2 parts; common salt, ½ part—2½ per cent. added to the food.

(*b*) Ground limestone or agricultural lime, 1 part; bonemeal or dicalcic phosphate, 1 part; common salt, ½ part—2½ per cent. added to the food.

If roots and tubers are extensively fed, the latter mixture is preferable. It is also the preferable mixture for brood sows, for which the quantity given should be increased to 3 or 4 per cent.

6. There is no advantage to be gained from the addition of iron, sulphur, iodine, &c., to mineral mixtures for pigs.

It is necessary to point out, in conclusion, that an adequacy of minerals in the diet of growing pigs is not of itself sufficient to ensure good results; the animals must also have conditions whereby they can utilise the minerals. This necessitates their obtaining a liberal supply of Vitamin D—the anti-rachitic factor that controls the assimilation of minerals and an absence of which will cause unthriftiness, paralysis, and rickets to develop, even though minerals be abundantly present. Sunlight is the most potent (and also the cheapest) supplier of this essential vitamin, and pigs running out in the open and exposed to it will, of course, receive all they require of it. If, however, they are confined to sties, these should be so constructed that they will let in plenty of sunlight. Green feed is also well supplied with Vitamin D and can advantageously be fed.

ANNUAL REPORT ON PASTURE WORK, KYBYBOLITE, 1933-34.

[By L. J. Cook, R.D.A., Manager.]

A comparatively good pasture season was experienced during 1933-34, and of 524 acres of fields and plots that have been used as permanent pasture during recent seasons, 258 acres (49 per cent.) of them recorded increased carrying capacity over the previous season, and the majority of the other fields exceeded the average for the past six seasons. Consequently a further increased number of livestock was carried on the Farm for the year.

Throughout the agricultural year, April 1st, 1933, to March 31st, 1934, an average of 1,626 sheep and 143 cattle have been kept, as against 1,460 sheep and 127 cattle during the previous 12 months, showing an increase of 166 sheep and 16 cattle. Approximately 236 acres of temporary pasture were available during the season, and 147 acres were sown to crops. Hence 760 acres pasture, with the stubble feed of 147 acres, have provided feed for 1,626 sheep and approximately 81 head of growing cattle wholly throughout the season, as well as provide full pasturage for 49 milking cows during the pasture growing period, and portion of their feed during the balance of the year. Also 25 horses have had part-time grazing. Besides above grazing 83 tons pasture growths were cut for silage making, and 22 tons meadow hay were made and stored from various fields. One hundred and ten acres of the general pasture fields were not top dressed this season, and another 100 acres received only ½cwt. application per acre. Naturally the quantity and quality of feed was less through this shortage of top dressing, but sufficient was available for the above livestock on the Farm.

The Season.

The season commenced well, a good germinating rain being received during the first week of March, which was followed by showery conditions in that month. About middle of April, a very fine rain of over 2in. gave the pasture plants really good vigour. This was followed by 5in., well distributed throughout the month of May, causing an exceptionally fine growth of pasture plants for the winter months. June and July produced mild conditions with only light rains, so that no trouble was caused by excessive wet conditions. Very good falls were recorded during August, September, and early October, enabling plenty of early spring growth to be made. A setback was then received from a dry, comparatively warm period of six weeks, which caused plants to run to maturity rather quickly.

Very good rains were received during the third week of November, but these were really too late to give a lot of benefit to the pastures, and caused a reduction in the quality of the meadow hay, which was being cured in the fields at the time. Summer rains were below average, but plenty of dry feed was available in the paddocks to carry the stock along until the break of the season in 1934. Altogether 22.30in. of rain fell during the agricultural year, which was 60 points in excess of the average for the past 28 seasons.

The following table shows the monthly rainfall of recent years compared with the average for the past 28 seasons:—

	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1906-33.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
April	2·10	0·20	1·50	3·12	1·15	1·98	2·32	2·32	1·36
May	3·17	2·92	2·24	2·16	1·39	2·54	0·86	4·97	2·56
June	1·24	1·63	2·53	3·32	0·34	3·40	3·38	0·93	2·73
July	2·71	2·14	2·71	3·08	4·34	2·52	2·46	0·93	2·83
August	3·31	4·02	0·90	1·84	3·65	2·32	2·48	2·79	2·65
September	1·79	0·91	3·12	1·75	2·95	1·85	1·39	3·65	2·64
October	2·27	0·52	4·47	1·50	2·55	0·47	1·58	1·05	1·84
November	0·68	2·06	0·99	0·97	0·93	0·38	0·59	3·90	1·47
December	0·83	1·31	0·17	1·66	2·94	0·06	0·74	0·79	1·13
	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	
January	0·51	1·59	1·35	0·02	1·59	0·02	1·03	0·42	0·55
February	1·20	1·74	0·22	1·57	0·10	1·92	0·02	0·19	0·98
March	0·96	0·55	0·65	0·06	0·98	2·11	1·12	0·36	0·98
Total ..	20·77	19·59	20·85	21·05	22·91	19·57	17·97	22·30	21·72

IMPROVEMENT OF NATURAL PASTURES WITHOUT CULTIVATION.

The work of top dressing natural pastures with phosphatic fertilisers and lime was commenced in 1919, additional plots have been added from time to time, and at present there are 13 plots being used for this work, nine of which are 3½ acres in area, and four are 5 acres each. Since 1921 careful records of the grazing secured from the plots have been kept. For the past five seasons the plots have been continuously grazed in rotation by four flocks, constituted according to the estimated carrying capacity, and a separate flock has been used for each type of fertilised pasture. That is: A flock, 12 sheep, has been used on unmanured land, 13½ acres; B flock of 35 sheep has been used on 14 acres of land improved with superphosphate; C flock of 48 sheep has been used on 17 acres of land improved with lime and superphosphate; while D flock of 20 sheep has been used on 10½ acres of land improved with rock phosphates. Another small flock has been used on all fertilised plots as required to utilise excess feed. Similar type and aged sheep have been used in each flock, constituted of 25 per cent. Waite Institute Merino wethers and 75 per cent. Kybybolite Comeback ewes.

Through the assistance of the Waite Research Institute we have been able to weigh these sheep monthly, and so keep a definite record of their development on this type of pasture.

This season further consideration has been given to the botanical analysis of these pastures, and once per month throughout the growing period percentage estimates were made by taking six indiscriminate quadrat readings over each plot.

The following table shows the fertiliser applied, with date and rate of applications, whilst Table 3 shows the grazing results secured.

TABLE 2.—*Fertilising of Natural Grazing Test, Kybybolite,* 1919-34.

Plot.	Total Fertiliser per Acre.	Date and Rate of Application.
6	No manure (check plot)	—
12	No manure (check plot)	—
1	1 ton Aluminium Phosphate Rock (412lbs. phosphoric acid)	1919, one application
4	11cwts. Calcium Phosphate Rock (232lbs. Phos. acid) .	1919, one application
	6cwts. Clacium Phosphate Rock (127lbs. Phos. Acid) ..	1920-25, 1cwt. per annum
	4cwt. 82% Calcium Phosphate Rock (168lbs. Phos. Acid)	1926-33, ½cwt. per annum
5	1 ton Calcium Phosphate Rock (422lbs. Phos. Acid) ...	1919, one application
	10cwts. Calcium Phosphate Rock (420lbs. Phos. Acid) .	1929, one application
11	6cwts. Ephos. Phosphate (188lbs. Phos. Acid).........	1924, one application
2	11cwts. Aluminium Phos. Rock (227lbs. Phos. Acid) ..	1919, one application
	6cwts. Aluminium Phos. Rock (124.bs. Phos Acid)	1920-25, 1cwt. per annum
	408lbs. 45% Superphosphate (84lbs. Phos. Acid)	1926-33, 51lbs. per annum
7	900lbs. 45% Superphosphate (185lbs. Phos. Acid)	1924-33, 90lbs. per annum
8	1440lbs. 45% Superphosphate (297lbs. Phos. Acid)	1926-33, 180lbs. per annum
3	1 ton Lime (Calcium Carbonate)	1919, one applicatiln
	1 ton Lime (Calcium Carbonate)	1929, one application
	1,680lbs. 36% Superphosphate (277lbs. Phos. Acid) ...	1919-33, 1cwt. per annum
10	1 ton Lime (Calcium Carbonate)	1924, one application
	1,120lbs. 45% Superphosphate (231lbs. Phos. Acid) ...	1924-33, 1cwt. per annum
9	1 ton Gypsum (Calcium Sulphate)	1926, one application
	896lbs. 45% Superphosphate (185lbs. Phos. Acid)	1926-33, 1cwt. per annum
13	1 ton Crushed Limestone (Calcium Carbonate)	1926, one application
	896lbs. 45% Superphosphate (185lbs. Phos. Acid)	1926-33, 1cwt. per annum

TABLE 3.—*Returns of Natural Grazing Test, Kybybolite,* 1921-34.
Grazing in sheep per acre.

Year.	Check Plots.		Rock Phosphate Plots.			Plot 11.	Superphosphate Plots.			Lime and Super. Plots.			Gypsum and Super.
	Plot 6.	Plot 12.	Plot 1.	Plot 4.	Plot 5.		Plot 2.	Plot 7.	Plot 8.	Plot 3.	Plot 10.	Plot 13.	Plot 9.
1921-22	1·11	—	1·52	1·48	1·33	—	1·64	—	—	1·84	—	—	—
1922-23	0·83	—	1·47	1·20	1·27	—	1·41	—	—	2·06	—	—	—
1923-24	0·80	—	1·91	1·33	1·53	—	1·31	—	—	2·50	—	—	—
1924-25	1·36	—	2·72	3·00	3·05	—	2·73	—	—	4·25	—	—	—
1925-26	0·71	0·81	1·64	1·78	1·71	1·27	1·58	1·13	—	2·92	1·54	—	—
1926-27	0·56	0·99	1·84	1·59	1·84	1·67	1·66	1·91	1·27	3·81	1·78	1·99	0·98
1927-28	0·68	0·97	1·95	1·74	1·98	1·89	1·98	1·79	1·34	2·58	2·16	1·86	1·50
1928-29	0·66	0·58	1·61	2·24	2·30	2·17	2·63	2·42	2·06	3·24	3·60	2·54	2·08
1929-30	0·86	1·05	1·11	1·38	1·62	1·85	2·40	2·36	2·15	3·73	2·42	2·52	1·95
1930-31	0·82	1·28	1·84	1·94	2·11	2·34	2·83	3·02	3·80	3·65	3·47	3·39	3·33
1931-32	0·82	1·25	1·58	2·04	2·71	2·33	3·26	3·79	3·99	3·60	2·92	3·31	3·63
1932-33	0·64	1·33	1·64	2·48	2·27	2·67	3·05	3·83	3·87	3·63	3·33	3·82	3·47
1933-34	0·71	0·98	1·44	2·63	2·77	1·96	3·51	3·58	4·26	4·59	2·90	3·83	3·34
Means—1921-34 .	0·81	—	1·71	1·91	2·04	—	2·31	—	—	3·26	—	—	—
1926-34 .	0·72	1·05	1·63	2·01	2·20	2·11	2·67	2·84	2·84	3·60	2·82	2·91	2·54
	0·89			2·10				2·78			3·11		
Increase above no manure —													
13 years average	—	—	0·90	1·10	1·23	—	1·50	—	—	2·45	—	—	—
8 years average	—	—	0·74	1·12	1·31	1·22	1·78	1·95	1·95	2·71	1·93	2·02	1·65
				1·21				1·89			2·22		
Increase above rock phosphate dressed plots— 8 years average.	—	—	—	—	—	—	0·57	0·74	0·74	1·50	0·72	0·81	0·44
								0·68			1·01		
Increase above superphosphate dressed plots— 8 years average.	—	—	—	—	—	—	—	—	—	0·82	0·04	0·13	—
											0·33		

The return in quantity of growth from these plots, as shown by the sheep carried per acre, is continuing to increase. The average return for all fertilised plots in the series has been 3.14 sheep per acre for the season, which is the highest return so far received, and is ¾ sheep per acre above the average secured for the past 13 seasons. It is significant that all plots on which the application of fertiliser has been maintained have yielded in excess of their averages, whilst only four, namely, the two check plots Nos. 6 and 12, that have never been fertilised, and Nos. 1 and 11 that were top dressed with rock phosphate 14 and nine years ago respectively, have yielded returns below their averages.

Four plots yielded their best return since commencement, namely—No. 3, fertilised with lime and superphosphate carried 4.59 sheep per acre, a record for this type of pasture; No. 8 fertilised with 180lbs. superphosphate carried 4.26 sheep, which is also a record for superphosphate on this type of pasture; No. 13 fertilised with limestone and superphosphate carried 3.83 sheep, a slight increase on the previous season; and No. 2 fertilised with 51lbs. superphosphate carried 3.51 sheep, which is considerably better than the average secured from this plot.

For the season the three plots dressed with lime and superphosphate have averaged 3.77 sheep per acre, and the three plots dressed with superphosphate only have averaged 3.78 sheep, practically no difference, whilst the two plots, Nos. 4 and 5, that have received continued applications of rock phosphate carried 2.70 sheep, approximately one per acre less.

The same plots averaged over the immediate past eight seasons have carried 3.11, 2.78, and 2.10 sheep per acre per annum respectively, showing an increase of 0.33 (12 per cent.) sheep for lime and superphosphate over superphosphate only; 1.01 (48 per cent.) sheep for lime and superphosphate over rock phosphate; and 0.68 (32 per cent.) sheep for superphosphate over rock phosphate.

Compared with the check plots (no manure) the same three series of plots have shown increases of 2.22 (249 per cent.), 1.89 (212 per cent.), and 1.21 (146 per cent.) sheep per acre per annum for the eight seasons.

It is noted that the plots dressed only with superphosphate have become as productive during recent years as those dressed with lime and superphosphate. Rock phosphate dressed plots maintain a production intermediate between the lime and superphosphate dressed plots and the check plots.

In the following table the averages of all plots for the past eight seasons have been grouped together according to the various forms of fertiliser, and shows an interesting comparison of returns and value.

TABLE 4.—*Comparative Summary of Eight Years' Grazing on Topdressed Natural Pasture.*

Fertilisers Applied.	Area.	Sheep per Acre.	Increase over no Manure.	Increase over Superphosphate.	Increase over Rock Phosphate.	Annual Cost of Fertiliser per Acre.	Annual Cost of Fertiliser per Sheep.	Profit per Acre per Annum, Sheep at 15s.
	Acres.		%	%	%	*s. d.*	*s. d.*	*s. d.*
Lime and Superphosphate (W.S.P.)	8½	3·14	253	13	50	11 0	4 11	22 9
Crushed limestone and Superphosphate (W.S.P.)	5	2·91	227	4·7	39	8 3	4 1	22 1
Superphosphate (W.S.P.)	8½	2·78	212	—	32	5 8	3 0	22 8
Gypsum and Superphosphate (W.S.P.)	3½	2·54	185	—	21	10 9	6 6	14 0
Ephos Phosphate (Cit. and Acid Sol. Phos.)	5	2·11	137	—	0·5	6 0	4 11	12 4
Crushed Rock Phosphate (A.S.P.)	10½	2·10	136	—	—	4 2	3 5	14 0
No manure (Check plots)	8½	0·89	—	—	—	—	—	—

This table shows that when sheep are valued at 15s. each per annum the profit obtained due to fertiliser has been approximately the same from the use of superphosphate only and from lime and superphosphate combined. The cost of superphosphate dressings has been 5s. 8d. per acre, or 3s. per sheep, whilst that of superphosphate and lime combined has been 11s. per acre, or 4s. 11d. per sheep. The extra sheep carried on the lime and superphosphate plots has only covered costs.

Crushed limestone and superphosphate combined shows a profit of 22s. 1d. per acre per annum, only 8d. less than the burnt lime and superphosphate, whilst gypsum and superphosphate combined and Ephos phosphate have returned much lower profits with 14s. and 12s. 4d. per acre respectively.

Rock phosphate, with its low annual cost of 4s. 2d. per acre, has returned 14s. per acre profit.

With reference to the type and variety of plants growing on these series of plots, the monthly estimations taken throughout the growing period this season have been averaged, and are shown in the following table.

TABLE 5.—*Botanical Analysis of Natural Pasture Plots, Kybybolite, 1933.*

Species.	Rock Phosphate Plots.	Superphosphate Plots.	Lime and Superphosphate Plots.	Average all Fertilised Plots.	Check Plots. No Manure.
	%	%	%	%	%
Grasses	65·45	68·58	67·99	67·79	44·87
Clovers	16·23	19·75	10·07	14·50	0·18
Erodium	0·96	1·78	7·04	3·16	Trace
Thistles	0·08	0·68	2·32	1·00	0·35
Capeweed	0·12	0·65	1·49	0·68	0·12
Miscellaneous	12·39	6·64	7·95	9·22	29·76
Bare space	4·76	1·91	3·12	3·63	24·72

Factors of note from this table are that the percentage of grass on all fertilised plots was comparatively constant, varying only from 65 per cent. on rock phosphate plots to 68 per cent. on superphosphate plots, whereas the amount of grass on unmanured plots was only 45 per cent. Naturalised clovers varied from 10 per cent. on lime and superphosphate to 20 per cent. on superphosphate only plots, compared with only 0.18 per cent. on no manure plots. It is perhaps significant that erodium has increased to 7 per cent. on the lime and superphosphate plots, whilst only 1 to 2 per cent. has been recorded on other fertilised plots, and it is scarcely present on check plots. Also thistles and cape weed are more plentiful on the lime and superphosphate land. The amount of miscellaneous or useless growths are more numerous on the check plots, close upon 30 per cent., and rock phosphate dressed plots 12 per cent., whereas the better fertilised land has reduced these growths to 6 and 8 per cent. Similarly the amount of bare space is very much greater on the unmanured land, approximating 25 per cent. against 2, 3 and 5 per cent. respectively.

Time would not permit to fully analyse the various grasses that grow on the plots, but each autumn counts and measurements were made of the Danthonia (native Wallaby grass) plants by reading six indiscriminate square metres on each plot. On averaging the growths of the last two autumns, the number and size of plants per square metre on the various fertilisings are as follows:—

	Number of Plants.	Diameter in Inches at Ground Level.
Check plots (no manure)	109	0.82
Rock phosphate dressed plots	59	1.39
Superphosphate dressed plots	32	1.56
Lime and superphosphate dressed plots	24	1.32

This work shows that the fertilising has apparently depressed the number of permanent native grass roots, but at the same time has increased the vigour of those that have survived.

In considering the behaviour of sheep flocks used for grazing these natural pasture plots, the following table shows the average live weight of Comeback ewes, the average weight of wool, percentage of lambs marked, average weight of lambs at weaning, and the sheep carried per acre for each of the four flocks during the past four seasons.

TABLE 6.—*Weight of Sheep and Wool, Natural Pasture Plots,* 1930-34.

Flock.	No. of Ewes.	Kind of Fertiliser on Plots.	Average Weight of Ewes.			Average Weight of Wool per Sheep.				Lambs Marked.			Average Weight of Lambs at Weaning.			Sheep Carried per Acre.		
				lbs.			lbs.	ozs.			%			lbs.				
A	9	No manure	8/4/30	83·8		17/10/30	6	10		9/10/30	22		8/1/31	40·0		1930-1	1·16	
			31/3/31	93·2		21/10/31	8	7	8 2	1/10/31	66	64	5/1/32	60·8	57·0	1931-2	1·00	1·04
			30/3/32	90·7	93·0	25/10/32	9	6		1/10/32	79		17/1/33	61·9		1932-3	1·11	
			31/3/33	98·6		12/10/33	8	1		1/10/33	89		4/1/34	65·3		1933-4	0·89	
			31/3/34	98·7														
B	26	Superphosphate	8/4/30	90·0		17/10/30	6	14		9/10/30	81		8/1/31	44·5		1930-1	2·87	
			31/3/31	82·5		21/10/31	8	0	8 5	1/10/31	50	76	5/1/32	57·3	54·5	1931-2	3·27	3·34
			30/3/32	98·5	94·3	25/10/32	9	13		1/10/32	92		17/1/33	57·0		1932-3	3·44	
			31/3/33	100·6		12/10/33	8	8		1/10/33	80		4/1/34	59·1		1933-4	3·78	
			31/3/34	99·7														
C	36	Lime, Gypsum, and Superphosphate	8/4/30	89·3		17/10/30	7	10		9/10/30	89		8/1/31	39·2		1930-1	3·45	
			31/3/31	87·3		21/10/31	8	3	8 2	1/10/31	66	84½	5/1/32	52·6	51·8	1931-2	3·32	3·48
			30/3/32	95·3	96·3	25/10/32	9	7		1/10/32	86		17/1/33	58·4		1932-3	3·56	
			31/3/33	106·1		12/10/33	7	5		1/10/33	94		4/1/34	56·9		1933-4	3·61	
			31/3/34	103·5														
D	15	Rock Phosphate	8/4/30	91·2		17/10/30	8	11		9/10/30	80		8/1/31	44·2		1930-1	1·96	
			31/3/31	84·7		21/10/31	7	15	8 6	1/10/31	73	79	5/1/32	48·5	51·5	1931-2	2·11	2·12
			30/3/32	84·3	89·4	25/10/32	9	7		1/10/32	93		17/1/33	53·5		1932-3	2·13	
			31/3/33	89·6		12/10/33	7	9		1/10/33	71		4/1/34	59·9		1933-4	2·28	
			31/3/34	97·4														

All of the ewes in the above flocks are of similar age and breeding (1928 spring drop), and were selected as even in type and development in May, 1929. Since then they have been kept wholly on the one class of pasture. Except for a few weeks in the autumn of each season, when the 86 ewes were mated together as one flock with Merino rams, they have been pastured on the respective plots, fertilised as shown in the table. They have received no hand-feeding, nor provided with any licks.

The average live weights of ewes quoted are those taken about the close of March each season, a time when their weights were lowest. During each season of growing pasture, the ewes increased in weight, and during each late summer and autumn they decreased in weight.

The average maximum weights attained by the four flocks for the four seasons, which occurred in the late spring were:—

	Lbs.
Flock A	107.4
Flock B	116.7
Flock C	120.4
Flock D	104 5

When these are compared with the autumn weights given in Table 6, it is seen that the average difference between the maximum and minimum weights of each flocks has been:—

	Lbs.	Variation. Per Cent.
Flock A	14.4	13.4
Flock B	22.4	19.2
Flock C	24.1	20.0
Flock D	15.1	14.4

Hence the ewes pasturing on the natural pasture, that has been fertilised with superphosphate only, and with lime and superphosphate combined, have shown that they reached much higher live weights during the flush parts of the seasons, but also lost considerably more pounds in weight during the leaner grazing periods. At all times, however, they maintained a greater average weight than those on unfertilised pasture. Those on pasture fertilised with both lime and superphosphate have maintained slightly better weights than those on pasture fertilised only with superphosphate, especially during the last two seasons.

As regards the wool production the figures in the table show that there has been no material difference between the flocks. There has been a difference of only 4ozs. per head between the highest and lowest average—8lbs. 2ozs. per head from Flocks A and C, 8lbs. 5ozs. from Flock B, and 8lbs. 6ozs. from Flock D.

The lambing percentages, however, show a distinct difference, those on the lime and superphosphate pasture yielding an average of 84 per cent. over the four seasons, as against only 64 per cent. from the flock on unmanured pasture, the former producing the highest percentage of the four flocks in two seasons, 1930 and 1933, whilst D flock on rock phosphate fertilised pasture gave the highest percentage in the other two seasons, 1931 and 1932. Both B and D flocks, with 76 per cent. and 79 per cent. averages, were considerably better breeders than A flock.

The weights of lambs at weaning show that those from the A flock to have been the heavier lambs. This is due entirely to the different summer feed available during December on the unfertilised pasture. The fertilised pastures at this time of the year contain a large proportion of dry annual grasses, such as barley and silver grasses, with their objectionable seed

heads, which have proved detrimental to the lambs. It is definitely not due to the strength of the lambs, as the lambs in B and C flocks have invariably been stronger from birth, and for the four seasons averaged 3lbs. greater in weight during October months, than those on the unmanured pasture.

It must be noted that to supplement the amount of unfertilised feed, Plot No. 9 in unmanured clover land series has necessarily had to be used at times by Flock A, which accounts for the carrying capacity of plots grazed showing at 1.04 sheep per annum, which is higher than unfertilised virgin land, and should, if anything, give the flock an advantage.

Regarding the losses of sheep that have occurred amongst these flocks, four ewes of the original 87 have died, two in Flock B, and two in Flock D. Of the former one died as a hogget in 1929, and the other died at four years of age in 1932. The two ewes in Flock D both died in 1933 at five years of age. The annual percentage loss of ewes over the five seasons for each flock has therefore been as follows:—

		Per Cent.
Flock A (9 ewes)	Nil	
Flock B (27 ewes)	2 deaths	1.48
Flock C (36 ewes)	Nil	
Flock D (15 ewes)	2 deaths	2.67
All flocks (87 ewes)	4 deaths	0.92 per annum

Referring to the losses of lambs that have occurred between marking and weaning for the four lambing seasons, these have been as follows:—

Flock A has lost 2 lambs from 23 marked, *i.e.*, 2.18 per cent. per annum
Flock B has lost 5 lambs from 80 marked, *i.e.*, 1.56 per cent. per annum
Flock C has lost 6 lambs from 121 marked, *i.e.*, 1.24 per cent. per annum
Flock D has lost 0 lambs from 47 marked, *i.e.*, nil

Total .. .. 13 lambs from 271 marked is 1.2 per cent. per annum

During the immediate past two seasons, a record has been kept of the losses of lambs at birth, and between birth and marking. The numbers for each flock for both seasons have been:—

Flock A	3 lambs, *i.e.*,	16.6 per cent. annual loss
Flock B	4 lambs, *i.e.*,	7.7 per cent. annual loss
Flock C	6 lambs, *i.e.*,	8.3 per cent. annual loss
Flock D	1 lamb, *i.e.*,	3.3 per cent. annual loss
Total	14 lambs, *i.e.*,	8.1 per cent. annual loss

These losses, especially amongst the ewes, have been small, and indicate that the natural pasture is healthy for stock and suitable for wool production. When well improved by top dressing with phosphates and lime its growths are better for lamb breeding, and develop better sheep.

Summarily, the results of top dressing this natural pasture show a large increase in wool production per acre. The averages for the past four seasons show that the unmanured land has returned 8.45lbs. of wool per acre per annum; the same virgin land fertilised with superphosphate only has returned 27.76lbs. of wool (228 per cent. increase); fertilised with lime and superphosphate it has returned 28.27lbs. (234 per cent. increase), and fertilised with rock phosphates it has returned 17.75lbs. of wool (110 per cent. increase per annum) per acre per annum.

(To be continued.)

THE IMPORTANT PASTURE PLANTS OF SOUTH AUSTRALIA CONSIDERED AS TO THEIR IDENTIFICATION AND CHARACTERISTICS.

[By E. M. HUTTON, B.Ag.Sc., Field Officer.]

(*Continued from page* 344.)

C.—PLANTS, OTHER THAN GRASSES AND LEGUMES, OFTEN OF IMPORTANCE IN PASTURES.

1. EVENING PRIMROSE (*Cenothera odorata*).

This herbaceous biennial belongs to a small family of plants called the *Oenotheraceae.* In its young stages it exists as a rosette of narrow, hairless lanceolate leaves with slightly wavy margins and white midribs. Later the plants develop stiff, upright stems, which are hairy only in the upper half. The broader leaves of the stem are hairy, and half clasping. (See Fig. 43.) The conspicuous, yellow, sweet smelling flowers occur in a long leafy spike,

Fig. 43.—Evening Primrose (*Oenothera odorata*).
[*From Black's "Flora of S.A."*]

Fig. 44.—Rib Grass (*Plantago lanceolata*).
[*From Black's "Flora of S.A."*]

and they tend to be purplish when they fade. Evening primrose produces a large number of small brown seeds in the basal portion (ovary) of the stemlike tube beneath the flower.

It has a deep taproot system, and grows best in relatively poor sands, especially in the better districts as at Keith, Tintinara, Port Vincent, and Roseworthy. Its feeding value is relatively high, and it grows most of the year, the growth having a spring and summer incidence. In a paddock seeded down to a pasture mixture

containing Evening Primrose, it will be found after a few years that the Primrose is practically confined to the sandy rises. There is no doubt that Evening Primrose, probably with Dwalganup Early Subterranean clover, has a definite place on poor sandy soils of the cereal cultivation belt.

2. PLANTAIN or RIB GRASS (*Plantago lanceolata*).

This herbaceous perennial belongs to a small family of plants called the *Plantaginaceae*. In the early stages it can be recognised by its rosette of toothed lanceolate, dark green leaves, which are often woolly and hairy, and which are conspicuously ribbed longitudinally. Later several flower stalks bearing short spikes of small flowers are developed. (See Fig. 44.) Each flower produces two dark oblong seeds which are channelled on one face.

Rib Grass is a common constituent in the pastures of the settled districts. It does not possess a very high nutritive value, but is relatively rich in iron, and thus has medicinal properties. For this reason it is often included in English

Fig. 45.—Hog Weed (*Polygonum aviculare*).
[*From Black's "Flora of S.A."*]

Fig. 46.—Wild Geranium (*Erodium botrys*).
[*From Black's "Flora of S A."*]

pasture mixtures. A sprinkling of rib grass through a good sown pasture is therefore of benefit, rather than a disadvantage. On poor dry soils it often forms one of the main constituents of natural pastures, and its chief value here lies in the fact that it provides green picking in the hotter months for stock, because its growth is mainly confined to the spring and summer.

3. WIREWEED or HOG WEED (*Polygonum aviculare*).

This is a hairless, prostrate annual, belonging to the family *Polygonaceae*, to which belongs the Docks, Sheep Sorrel, and Prickly Jack. It has small lanceolate leaves, long stiff wiry stems, and very small pinkish flowers, each of which forms a small reddish-brown nut. (See Fig. 45.)

Although a troublesome weed, particularly on stubbles, it has a high nutritive value when young, in spite of its large amount of fibre, and is highly prized in many cereal districts for fattening sheep in early summer.

4. WILD GERANIUM or CROWFOOT (*Erodium botrys* and *Erodium moschatum*).

The former appears to be commoner in the districts receiving 22ins. rainfall and over, while the latter appears to be more frequent under 22ins. rainfall.

E. botrys often adopts a rosette habit in the young stages. It can be definitely recognised by the fact that the leaves are cut into toothed lobes halfway to the midrib. (See Fig. 46.) It has purplish flowers and the beak which is formed from the flower is very long, being 2½ins. to 4ins. in length. In *E. moschatum* the leaves are cut into definite segments to the midrib, and the pale purple flowers develop short beaks 1 to 1½ins. long. (See Fig. 47.)

At the Waite Institute, Trumble and Fraser (Bulletin No. 268 of the Department of Agriculture) found that *E. botrys* became an important constituent of topdressed natural pasture, mainly because it responded to the superphosphate

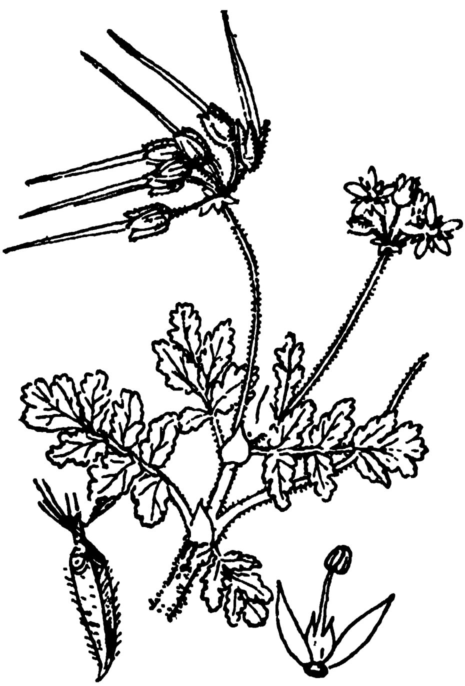


Fig. 47.—Wild Geranium (*Erodium moschatum*).
[*From Black's "Flora of S.A."*]

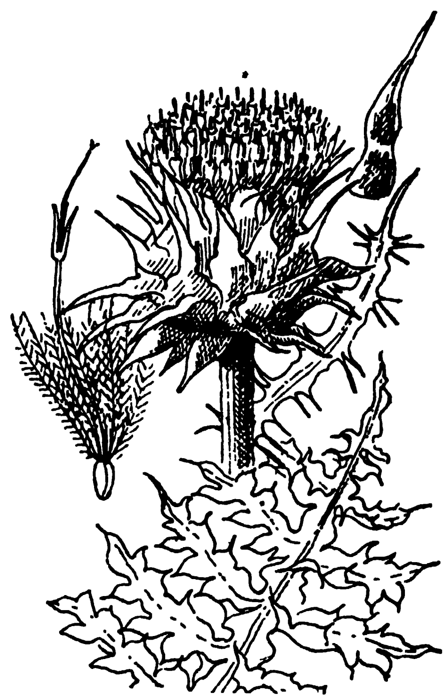


Fig. 48.—Wild Artichoke (*Cynara cardunculus*).
[*From Black's "Flora of S.A."*]

and to added nitrogen, due to the stimulation of clovers, and because grazing favours the development of plants with a rosette of leaves close to the ground. In C.S.I.R. Bulletin No. 49, it is pointed out that *E. botrys* has a high mineral content on top-dressed soil, having at the flowering stage an unusually high percentage of nitrogen and lime (each about 4 per cent.), and a very high phosphorous content (about 1 per cent.) when compared with such pasture species as Subterranean Clover and Wimmera Rye Grass. In spite of its high mineral content, its

value in pastures is limited by the fact that it produces no green feed for six months of the year, and is suitable for grazing for less than a month, being one of the first pasture annuals to mature. At maturity, about 30 per cent. of the dry weight of the plant is in the sharp inedible seed formed. As $\frac{2}{3}$ to $\frac{3}{4}$ of the plant nutrients are in this inedible seed, the plant is useless for stock at this stage.

The same remarks would apply to *E. moschatum*.

5. WILD ARTICHOKE (*Cynara cardunculus*).

This stout, erect, perennial belongs to the *Compositae,* which is practically the largest family of plants and which contains such common plants as the thistles, dandelion, chicory, stinkwort, and groundsel. The leaves are much dissected into lobes, each lobe terminating in a spine. (See Fig. 48.) The numerous small blue flowers are clustered into a large flowerhead, which is surrounded by a number of sharp, rigid, leaflike bracts at the base.

Wild Artichoke is common on waste land and along the roadsides of the better settled districts as at Clare, Morphett Vale, and Salisbury. It appears to prefer heavy to medium soils, and at least an 18in. rainfall. Its main value lies in the fact that it produces a succulent forage in the dry November to February period. It is especially relished in the younger stages, when the spines are not so well developed. Ensiling wild artichoke converts it into a useful forage by softening the objectionable spines.

A spineless artichoke (*Cynara acaule*) exists naturally in isolated patches in South Australia, as at Clare and Roseworthy. It would be of definite value in some of our districts if it were developed and seed became available.

6. SALTBUSHES, BLUE BUSHES, AND EDIBLE SHRUBS.

Very little conclusive work has been done on the grazing values of these important natural groups, because they are mainly used as pasture plants in the large tracts of very sparsely populated pastoral country receiving less than a 15in. rainfall.

The mallee is practically confined to the region between the 8in. and 20in. rainfall lines, and the saltbush flora becomes increasingly important north of the 12in. rainfall line. The best edible shrubs are mainly confined to the mallee area.

1. SALTBUSHES AND BLUE BUSHES.

These all belong to the large family *Chenopodiaceae*. Some of the commonest species of Saltbush occurring in country receiving 12in. of rainfall or more are:—Giant Saltbush, often called Oldman Saltbush (*Atriplex nummularium*—Fig. 49), Creeping or Berry Saltbush (*Atriplex semibaccatum*—Fig. 50), Angas Saltbush (*Atriplex Muelleri*), Dwarf Saltbush (*Atriplex halimoides*), Pop Saltbush (*Atriplex spongiosum*), Ruby Saltbush (*Enchylaena tomentosa*—Fig. 51), Oldman Saltbush (*Rhagodia parabolica*). In this area the important Bladder Saltbush (*Atriplex vesicarium*) is mainly replaced by the small grey *Atriplex stipitatum*. Grey Bush (*Kochia pyramidata*) is common in this region.

(1) Giant Saltbush (*Atriplex nummularium*—see Fig 49) is one of the tallest saltbushes, usually growing 6ft. to 10ft. high. It soon becomes scarce under heavy stocking, because it is readily eaten by stock. Its numerous spreading branches are clothed with fairly large, thick, succulent, almost circular, whitish leaves. The small male and female flowers are usually produced in panicles on separate plants. When not grazed this saltbush produces an abundance of seed, so that its cultivation would not be difficult.

(2) Creeping or Berry Saltbush (*Atriplex semibaccatum*—see Fig 50).—It is a perennial, with many slender, herbaceous, prostrate stems, with leaves which are greenish above and mealy-white below. In this saltbush the male and female flowers are on the same plant. When the fruits are fresh they appear as smooth, succulent bright red berries. When dry they become shrivelled and dark in colour.

At the Waite Institute Mr. Trumble experimented with Creeping Saltbush, Giant Saltbush, Dwarf Saltbush, Angas Saltbush, and Bladder Saltbush with a view to developing for the pasture areas of the cereal cultivation belt particularly, a pasture plant which will produce green succulent feed during the dry summer

Fig 49.—Old Man Salt-Bush (*Atriplex nummularum*).
[*From "Aust. Grasses and Pasture Plants," by F. Turner.*]

period. He found that Creeping Saltbush was easily the best for these conditions. At the Waite Institute this saltbush produced a dense prostrate mat of feed, which later produced abundant seed. It produced more feed than lucerne, and was able to produce over twice as much dry matter as lucerne on the same quantity of water. In C.S.I.R. Bulletin No. 49 Creeping Saltbush is shown to contain in the dry matter 15½ per cent. of soluble ash, and over 2½ per cent. nitrogen on top-dressed soil. Trumble found that this saltbush was deep rooting at the Waite Institute, and that its yield could be doubled with the application of nitrogenous manures.

Creeping Saltbush is not very well adapted to continuous or hard grazing, and it could never take the place of lucerne in those districts where the water-table is near the surface. In addition, where ensilage can be made satisfactorily, saltbushes would be of very limited value.

(3) Angas Saltbush (*Atriplex Muelleri*), Dwarf Saltbush (*Atriplex halimoides*), and Pop Saltbush are rather small insignificant saltbushes. Angas Saltbush is a low herb with thin coarsely toothed leaves, which are green above and mealy-white below. Dwarf Saltbush is a low stiff plant, with soft, thick, mealy-white leaves, and a spongy fruit with a wing near the summit.

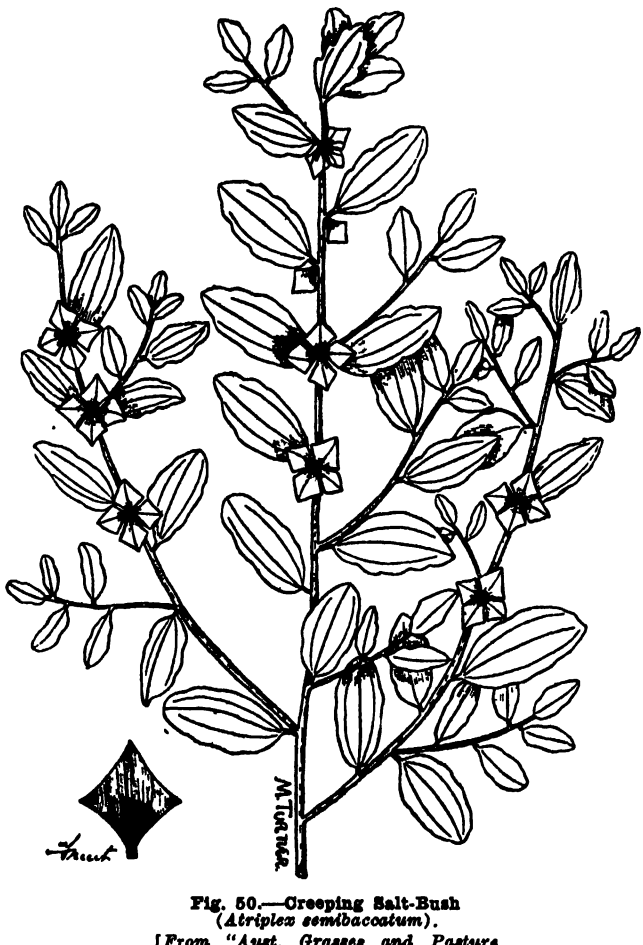


Fig. 50.—Creeping Salt-Bush (*Atriplex semibaccatum*).
[*From "Aust. Grasses and Pasture Plants," by F. Turner.*]

Pop Saltbush is very similar to Dwarf Saltbush in appearance. It can be distinguished from Dwarf Saltbush by the fact that the rounded spongy fruit is wingless.

(4) Ruby Saltbush (*Enchylaena tomentosa*—see Fig. 52).—This is a low, densely hairy shrub, with long prostrate stems, and small, slender, succulent, almost cylindrical leaves. It has small red or yellow berry-like fruits, which become black on drying. It is very common on sandy country near the sea.

(5) Oldman Saltbush (*Rhagodia parabolica*).—This is a tall-growing species which sometimes attains a height of 15ft. Cattle and sheep are particularly fond of it. It has mealy-grey leaves, which are often green on the upper surface. In this saltbush the small red globular fruit is a true berry, the seed being immersed in the pulp.

(6) Bladder Saltbush (*Atriplex vesicarium*).—This is an erect shrub about 1½ft. high, with rather thick, whitish leaves. The male and female flowers occur on different plants. The fruit is almost concealed by large, membranous, spongy appendages, on each side. This saltbush has been shown to be particularly high in minerals (23 per cent.).

(7) Grey Bush (*Kochia pyramidata*) is a many branched shrub growing about three or more feet high. The whole plant is covered with dense, soft, grey hairs. Sheep are particularly fond of its fleshy leaves. The fruit dries almost black.

The main species found within the 12in. rainfall line are Bladder Saltbush and the two Blue Bushes (*Kochia sedifolia* and *Kochia planifolia*). In this area overstocking will cause these highly palatable bushes to be eaten out, and the flora to revert to the hairless unpalatable "Bindy-eye," which possesses rather long penetrating spines on the fruit. "Bindy-eye," which is said to be a corruption of some native name, includes four species of *Bassia* which are avoided by stock because of the sharp spines on the fruit. If the land is badly eaten out, it will never regenerate and develop Bladder Saltbush again, but will remain under the useless "Bindy-eye." Relatively light and judicious stocking is thus essential for success. Rabbits (10 rabbits equivalent to one sheep) are so bad in some of the pastoral areas that they have tended to eat out the Saltbush and to cause the reversion to "Bindy-eye."

In the low rainfall areas the Saltbushes are very shallow rooted, the roots only penetrating 3in. or 4in. into the soil. The roots are deciduous, small bunches being formed when it rains. Later these roots fall off. Although the soil contains less than .01 per cent. of salt in the soil, the leaves of saltbushes contain a high percentage. As a result moisture is attracted and easily absorbed by the leaves. Dew, light showers, and air moisture (which become available through a drop in air temperature) are absorbed through the leaves and become available to the plant.

It appears that the study of Saltbushes is only of use in the lightly stocked, low rainfall pastoral areas. In the higher rainfall of the cereal belt, Saltbush could only be considered as a summer feed, and even then fodder conservation, and lucerne in some parts are much the better proposition.

2. EDIBLE SHRUBS.

Very little work has been done on the grazing value of the native shrubs. Although the best of them are confined to the 8-20in. rainfall mallee area, a number extend north beyond the 8in. rainfall line. F. Turner, in his book entitled "Australian Grasses and Pasture Plants," describes a number of the best edible shrubs in the pastoral country.

(1) Berrigan (*Eremophila longifolia*—see Fig. 52).—Other names given to this shrub are Long-leaved *Eremophila*, Native Plum Tree, Juniper Tree, Dogwood, and Emu Bush. F. Turner says: "It is a tall shrub, occasionally growing 25ft. high, with rather thick, narrow leaves, from 3in. to 5in. long, tapering into recurved points. Its drought-enduring properties are remarkable, for it grows under most adverse conditions of intense heat and aridity. Both cattle and sheep eat the leaves of this shrub with avidity, and seem to thrive on them."

It appears to grow in almost all the drier parts of Australia. Its pale-brown bark is rough and deeply fissured. It has the characteristic flower of the family *Myoporaceae*. The pink or red flower is densely hairy outside, and red spotted inside. The succulent globular fruit is blackish-purple.

(2) Butter Bush, Native Willow, Poison-berry Tree, or Apricot Tree (*Pittosporum phillyreoides*), family *Pittosporaceae*.—F. Turner says: "It is a handsome, evergreen shrub, attaining sometimes a height of from 15ft. to 25ft. It is often called 'Native Willow' on account of its pendulous smaller branchlets, which are clothed with dark-green foliage, giving it a graceful appearance, and making it a striking object amongst other vegetation. It occurs over a greater part of Australia, but principally in the arid interior, where it withstands a phenomenal amount of dry weather, without any appreciable check to its growth. Its rather narrow leaves are from 2in. to 5in. long and of a thick substance, and are much relished by cattle and sheep, which eat quantities of them in dry seasons. Even when quite young it produces a profusion of small, bell-shaped, pale-yellow flowers, which are succeeded by nearly oval fruits, containing numerous orange-coloured seeds enveloped in a sticky mass."

Fig. 51.—Ruby Salt-Bush (*Enchylaena tomentosa*). [*From Black's "Flora of S.A."*]

(3) Two members of the family *Sapindacea* are described in Turner's book.

Red Fruited Hop Bush (*Dodonaea lobulata*)—"Is a tall shrub 12ft. to 15ft. high, with thick, rigid, variously shaped leaves from 1in. to 2in. long. In many districts it is considered one of the best forage shrubs, and sheep will often stand on their hind legs to browse upon the foliage, which otherwise would be out of their reach. Its winged fruits, produced in great abundance, have a pleasant bitter flavour, and herbivora are remarkably fond of them."

Bullock Bush, Rose Bush, Rosewood, Emu Bush, or Cabbage Bush (*Heterodendron oleifolium*)—"It is found in the interior, and the leaves are from 2in. to 4in. long, and its small flowers are succeeded by seeds, each of which is partly enveloped in a red fleshy substance. In adverse seasons large quantities are cut, and both cattle and sheep feed upon the leaves with avidity and seem to do well on them."

SUMMARY AND CONCLUSION.

As R. C. Scott, Supervisor of Experimental Work, points out in his pamphlet, "Pasture Species for the Non-Irrigated Grasslands of South Australia," it is the 9 per cent. (22 million acres) of the total area of South Australia receiving greater than 15in. of rainfall with which we are mainly concerned from a pasture improvement point of view. Those regions receiving less than 15in. of rainfall (347,120 square miles) will always be a pastoral area of low carrying capacity, although there is no doubt that greater attention to its native shrubs, saltbushes, and grasses would bring about an improvement.

In the pasture areas proper (over 15in. rainfall) the main factor governing the intensity of development and the distribution of pasture species are—total annual rainfall, monthly distribution of the rainfall, mean monthly temperatures,

and the soil fertility. Trumble and Davies in the "Role of Pasture Species in Regions of Winter Rainfall and Summer Drought" have clearly shown that the South Australian climate can be classed as typically Mediterranean, that is, one having a period of summer stress followed by a period of effective winter rains. In his pamphlet, R. C. Scott further points out that even at the highest rainfall

Fig. 52.—Berrigan (*Eremophila longifolia*).
[*From "Aust. Grasses and Pasture Plants," by F. Turner.*]

centre in South Australia, Stirling West, receiving 47.08in. annual rainfall, a period of summer stress is evident, as during the six-monthly period October to May, a mean rainfall of 12.03in., or 26 per cent. of the total, is obtained, this period coinciding with the period of highest temperatures. Trumble and Davies have divided the pasture areas of the Mediterranean zone into three main areas:—

(1) The irrigated Murray swamps.

(2) The winter cereal cultivation belt receiving 15in. to 25in. per annum.

(3) The area of relatively liberal or extended precipitation receiving more than 20in. to 25in. per annum.

The pasture species which have been found by the Waite Institute and Agricultural Department to be the most suitable for the irrigated Murray swamps are:—N.Z. Certified Perennial Rye Grass, Cocksfoot, White Clover and Montgomery Red Clover as one mixture; Yorkshire Fog and Certified N.Z. White Clover as a mixture for poorly drained areas; *Phalaris tuberosa,* Kentucky Blue Grass, and Certified N.Z. White Clover as a mixture; Lucerne for mowing; Italian Rye Grass and Broad Red Clover as a temporary mixture; Prairie Grass.

The pasture species found to be the best for the cereal cultivation belt are—Lucerne; *Phalaris tuberosa* and Dwalganup Early Subterranean Clover as one mixture, and Wimmera Rye Grass and Early Subterranean Clover as another mixture in the 17in. to 22in. rainfall belt; Wimmera Rye Grass generally, especially on better class land; Burr Medic, Evening Primrose, possibly with Early Subterranean Clover, on the poor sandy soils.

In the area of liberal precipitation receiving more than 20in. to 25in. per annum, the best pasture species have been found to be Certified N.Z. Perennial Rye Grass and Late Subterranean Clover for soils of higher fertility (*e.g.*, old clover land) in areas with a favourable temperate spring, Wimmera Rye Grass and Late Subterranean Clover on second class soil (*e.g.*, bracken fern areas); *Phalaris tuberosa* and Late Subterranean Clover on both first and second class soil; Perennial Rye Grass and Strawberry Clover, or *Phalaris tuberosa* and Strawberry Clover, for the wet black lands of the South-East; Perennial Rye Grass and N.Z. Certified White Clover for rich, moist pockets of the Adelaide Hills; Strawberry Clover for marshy localities and rich swampy low-lying country; Late Subterranean Clover alone for very poor soils.

Thus it can be seen that, generally, our most useful pasture species are Perennial Rye Grass, Wimmera Rye Grass, *Phalaris tuberosa,* Lucerne, and Subterranean Clover when used in simple mixtures with low seeding rates. In special circumstances, species such as Cocksfoot, Yorkshire Fog, White Clover, and Strawberry Clover become important. Wimmera Rye Grass and *Phalaris tuberosa* appear to be the most elastic species.

The selection of the right species is only one link in the chain of pasture development. Other important links are—strain, manuring (especially superphosphate), and pasture management (especially rotational grazing, conservation of fodder as hay or ensilage, pasture renovation).

ACKNOWLEDGMENTS.

I wish to acknowledge the assistance of Mr. R. C. Scott, Supervisor of Experimental Work for reading the proofs, and for much valuable criticism and advice. In particular, I would like to thank my former lecturer, Mr. H. C. Trumble, M.Ag.Sc., Agronomist of the Waite Institute, for permission to use much of his data and his vegetative classification of grasses and clovers.

REFERENCES.

1. Agrostology lectures by Mr. H. C. Trumble.
2. Various articles on pasture experiments in South Australia by R. C. Scott.
3. Black's *Flora of South Australia.*
4. *Australian Grasses and Pasture Plants* by F. Turner.
5. C.S.I.R. Bulletins 49 and 80.
6. Botany lectures by Dr. J. G. Wood.

Other references are mentioned throughout the article.

RESULT OF WHEAT CROP COMPETITIONS: SEASON 1934-35.

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
ALFRED DISTRICT WHEAT CROP COMPETITION, 1934. Judged by R. L. Griffiths, D.D.A., District Agricultural Instructor.								
1	W. Paull & Sons, Alawoona	Gallipoli	28	23	19½	14	4	88½
2	G. J. Zimmermann, Meribah	Gallipoli	27	23½	18	14	5	87½
3	G. E. Hyde, Paruna .	Felix	28	21½	18½	14	5	87
4	E. K. Trotman, Paruna	Ranee	27	23½	18½	14	3½	86½
4	G. J. Zimmermann, Meribah	Sword	25	23½	18½	14½	5	86½
4	E. M. Edwards, Paruna	Ranee	26	22	20	14½	4	86½
7	A. C. Webb, Paruna .	Sword, Nabawa, Baringa	25	22	19½	14½	4½	85½
8	W. Paull & Sons, Alawoona	Ranee	25	23½	18½	14½	3½	85
8	C. R. Steele, Paruna .	Caliph	26	23	18	14	4	85
10	V. O. Stone, Malpas .	Ranee	24	22	19½	14	4½	84
11	A. C. Webb, Paruna .	Waratah and Sword	21	23	19½	14	4½	82
JERVOIS CROP COMPETITION, 1934-35. Judged by H. D. Adams, R.D.A., District Agricultural Instructor.								
1	E. Stubing, Cleve	Sword	31	24	17½	13½	4	90
2	J. Brus & Sons, Mangalo	Sword	29	24	18½	14	4	89½
3	E. Steinke, Cleve.....	E. Gluyas, 25; Waratah, 25	30	23	18	13½	4½	89
3	E. Stubing, Cleve	Ford	32	23	17	13	4	89
5	K. Nield, Cleve	Waratah ...	30	22	18	13½	3½	87
6	J. Sims, Cleve	Waratah ...	26	23½	19	13½	4½	86½
6	A. Spriggs, Cleve	Sword	26	23½	19	13½	4½	86½
6	W. Jericho, Cleve	Waratah ...	26	23½	18½	14½	4	86½
9	M. H. Burton, Rudall	Waratah, 30 ac.; Nabawa, 30 ac.	26	23½	19	13½	4	86
10	L. H. & D. A. Hogg, Darke's Peak	Waratah, 30ac.; Nabawa, 20ac.	24	23½	19	14½	4	85
11	J. J. Deer, Cleve	Waratah ...	25	23	18½	13½	4	84
11	D. C. McCallum, Rudall	Waratah ...	23	23½	19	14½	4	84
11	F. I. Kestel, Rudall ..	Bencubbin, 30; Waratah, 20	24	23	19	14	4	84
14	D. C. McCallum, Rudall	Sword	23	23½	19	13½	4	83
14	R. B. Deer, Cleve	Nabawa	24	22½	19	13	4½	83
16	H. Crosby, Cleve	Gluyas, 30; Nabawa, 20	24	22	18	13½	4	81½
17	G. Hunt, Darke's Peak	Waratah ...	22	23	18	13½	4	80½
18	A. H. Todd, Rudall ..	Waratah, 30ac.; Ford, 20ac.	20	22	17	13	4	76
—	W. F. Wake, Rudall	Withdrawn,	portion cut for hay.					

RESULT OF WHEAT CROP COMPETITIONS.—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	ALBERT DISTRICT WHEAT CROP COMPETITION, 1934.							
	Judged by R. L. GRIFFITHS, D.D.A., District Agricultural Instructor.							
1	A. E. Carslake, Kunlara	Gallipoli	27	21½	17	14	4½	84
2	H. Bird, Halidon ...	Sword	24	21½	18½	14½	5	83½
3	J. W. G. Mann, Mindarie	Gallipoli	25	21½	18½	14	4	83
4	A. G. W. Grant, Sandalwood	Gallipoli	25	21½	18½	13½	4	82½
5	J. B. Burnett, Caliph .	Gallipoli and Nabawa	23	21½	19½	14	3	81
6	G. H. Sutherland Copeville	Sultan and Ranee	24	22	16	14½	3½	80
7	J. F. Andriske, Galga	Gallipoli	20	21½	17½	14	3½	76½
8	W. H. Todd, Caliph .	Currawa	19	20	18	13½	5	75½
	SOUTHERN CROP COMPETITION, 1934.							
	Judged by R. HILL, R.D.A., District Agricultural Instructor.							
1	J. Rzeszkowski and Mattner Bros., Finniss	Sword	35	20	18	14½	4½	92
2	J. Bottroff, Palmer ..	Sword and Nabawa	27	20	19	14	4	84
2	G. R. Donaldson, Sandy Grove	Nugget	33	19	15	13	4	84
4	A. B. Jaensch, Hartley	Nugget	29	21	16	13½	4	83½
4	Thomas Bros., Monarto South	Sword	26	22	17½	14	4	83½
6	Frahn Bros., Monarto	Sword and Ranee	24	24	18½	13	3½	83
6	E. T. & L. Jaensch, Hartley	Sword	24	23½	17	14	4½	83
8	C. F. Altmann, Monarto South	Ranee	25	21	18	13	4·5	81½
9	E. T. & L. Jaensch, Hartley	Bencubbin ..	23	20	20	14	4	81
10	N. Wachtel, Palmer ..	Sword and Nabawa	21	23½	19	12½	4½	80½
10	Frahn Bros., Monarto.	Nabawa	23	22	18	14	3½	80½
12	E. E. Liebelt, Monarto South	Ranee and Joffre	26	21	17	12½	3½	80
13	C. A. Whittlesea, Langhorne's Creek	Gallipoli and Gluyas	22	23	18	13	3½	79½
13	A. F. T. Wachtel, Palmer	Nabawa	21	22	20	12	4½	79½
15	G. W. Faehrmann, Palmer	Nabawa	20	22½	18½	14	4	79
16	Mrs. E. J. Jaensch, Hartley	Daphne and Nabawa	24	20	17	13	4½	78½
17	Mrs. E. Hartmann, Monarto South	Dan and Sword	23	21	16	14	4	78
18	A. B. Jaensch, Hartley	Nabawa	23	21	17	13	3½	77½
18	Thomas Bros., Monarto South	Ranee and Nabawa	21	21	18	13½	4	77½
18	P. B. Frahn, Monarto	Currawa	21	20	18	14	4½	77½
18	A. R. Strauss, Monarto South	Nabawa.....	25	20	17	12	3½	77½
22	S. Wachtel, Palmer...	Sword and Nabawa	17	23½	18½	13½	4	76½

RESULT OF WHEAT CROP COMPETITIONS.—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	SOUTHERN CROP COMPETITION, 1934 - *continued.*							
23	H. A. Eckert, Belvidere	Sword and Gallipoli	22	20	17	13	4	76
24	Rankine Bros., Strathalbyn	Sword and Nabawa	24	19	15	13½	4	75½
24	J. F. C. Paech, Callington	Dan and Nabawa	18	20	20	14	3½	75½
26	L. H. Wachtel, Palmer	Ranee and Nabawa	18	21	18	12	4	73
27	T. O. Ramm, Palmer	Nabawa	16	22	18	13	3½	72½
28	H. B. Scheer, Mannum	Sword	15	22	18	14	3	72
28	J. Hartmann, Monarto South	Golden Drop and Sultan	20	19	18	11½	3½	72
30	H. A. Helbig, Mannum	Nabawa	16	22	18	12	3½	71½
31	C. Brook, Woodchester	Petatz Surprise, Ford, and Nabawa	19	18	17	13	3	70
32	S. A. Bretag, Mannum	Sword, Nabawa, & Ranee	14	21	17	12	3½	67½
33	C. M. Hein, Palmer...	Waratah and Gallipoli	13	18	14	11	3½	59½
—	H. H. Cross, Woodchester.	Cut for hay.						
	WESTERN DISTRICT WHEAT CROP COMPETITION, 1934. Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).							
1	L. C. Roberts, Pt. Pirie	Currawa	27	23	20	14	3	87
2	H. Williams, Pt. Pirie	Nabawa	29	20½	19	13	3½	85
3	H. G. Munday, Merriton	Waratah and Sword	29	22	17	13	3	84
4	A. G. Johns, Pt. Pirie	Nabawa and Ford	28	22	17	13	3	83
5	J. H. Holman, Telowie Creek	Ranee and Gallipoli	25½	22	18½	13	3½	82½
6	J. H. Holman, Telowie Creek	Carmichael's Eclipse	25	22	18½	13	3½	82
6	E. T. Franks, Box 157, Port Pirie	Currawa and Nabawa	26	22	19	13	2	82
8	Eagle Bros., Wandearah	Ranee	29	20	18	11	3	81
9	A. L. O'Shaughnessy, Wandearah	Sword	27	21	15	13	3	79
	SOUTHERN YORKE PENINSULA CROP COMPETITION, 1934. Judged by R. HILL R.D.A. (District Agricultural Instructor).							
1	Polkinghorne, H., Minlaton	Sword	32	21	20	13½	4½	91
2	Lister, T. K., Minlaton	Sword	34	21	17	13½	4½	90½
3	Dodd, A. L., Minlaton	Currawa	35	20	18	12	4	89
4	Boundy, W. G., Minlaton	Gallipoli, Ford, and Sepoy	33	21	18	12	4½	88½
5	Walters, L. R., Curramulka	Sword	29	21	19	13	4½	86½
6	Boundy, N. H., Minlaton	Waratah ...	30	20	19	12	4	85
7	Alderman, W. H. and N. J., Minlaton	Ford	30	21	17	12	4½	84½
8	Brechin, A. E., Curramulka	Nabawa, Sword, Ranee	26	20	18	12	4	80

RESULT OF WHEAT CROP COMPETITIONS.—*continued.*

Position.	Name and Address.	Variety. Maxima—	Apparent Yield. 35	Freedom from Weeds. 25	Freedom from Disease. 20	Trueness to Type. 15	Evenness of Crop. 5	Total. 100
	NORTHERN YORKE PENINSULA CROP COMPETITION, 1934. Judged by Mr. F. S. JONES.							
1	Meier, G. E. and H. M., Paskeville	Sword	34½	24	19	13	4	94½
2	Rodda, C., Boor's Plains	Gallipoli	35	24	19	12	3½	93½
3	Bussenschutt, J. H., Paskeville	Sword	34½	23	18	14	3½	93
4	Stanway, T. A., Boor's Plains	Sword	33½	23	18½	14	3	92
4	Yelland, L. E., Boor's Plains	Sword	34	21½	19	13½	4	92
6	Wright, M. D., Boor's Plains	Sword	32½	23	18½	14	3½	91½
7	Rodda, T., Boor's Plains	Sword	33½	22	18½	14	3	91
8	Yelland, C. R., Boor's Plains	Waratah ...	33½	22	18	13½	3½	90½
9	Cross, N. J., Boor's Plains	Sword	31	23½	18½	13½	3½	90
10	Yelland, R. M., Boor's Plains	Daphne	31	22	18½	13½	3½	88½
11	Northey, L. G., Boor's Plains	Sword	32½	19	17½	13	4	87
11	Rodda, A. C. R., Boor's Plains	Sword	30	22½	18½	13	3	87
13	Queale, H. K., Boor's Plains	King's White	31	22½	16	11	3½	84
13	Rodda, G. E.. Boor's Plains	Sword	28	20	18½	14	3½	84
	FAR NORTHERN DISTRICT WHEAT CROP COMPETITION, 1934. Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).							
1	A. Piggott, Morchard	Ford	30	24	19½	13	3	89½
2	H. G. Kupke, Morchard	Nabawa	29	22	19	14	3	87
3	E. H. Hampel, Terka	Ranee 4H ..	29	21	19	14	3	86
4	W. G. Gregurke, Wepowie	Felix	27	22	19	14	3	85
5	E. H. Hampel, Terka	Free Gallipoli and Currawa	29	22	18½	12	3	84½
6	H. G. Kupke, Morchard	Free Gallipoli	27	22	18	14	3	84
7	E. H. Hampel, Terka	Onas	29	22½	16	13	3	83½
7	W. F. L. Harris, Box 37, Orroroo	Felix	28	22	18	13	2½	83½
9	T. F. Orrock, Wepowie	Ranee 4H ..	27	22	19	13	2	83
9	E. W. Paech, Orroroo	Turvey	29	20	18	13	3	83
11	D. J. Crocker, Orroroo	Waratah and Nabawa	28	21	17	13	3	82
11	M. H. Modystach, Wilmington	Ranee	29	19	19	12	3	82
13	E. H. Schulz, Terka .	Onas and Ranee	28	20	18	13	2	81
14	J. W. G. Gale, Arwakurra	Ranee	27	22	18	11	2½	80½
14	B. S. McCallum, Morchard	Gluyas and Ranee	27	22	17	12	2½	80½
16	R. C. Llewelyn, Morchard	Ranee	26½	21	18	12	2½	80

RESULT OF WHEAT CROP COMPETITIONS.—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	BALAKLAVA DISTRICT CROP COMPETITION, 1934.							
	Judged by F. COLEMAN (Saddleworth), Member Advisory Board of Agriculture.							
1	J. Campbell, Barabba	Sword	34	25	19½	14	5	97½
2	R. P. Anderson, Balaklava	Sword	35	24	19½	14	4½	97
3	W. Ryan, Halbury ..	Sword	32½	24	19½	14	4½	95½
4	J. Campbell, Barabba	Ford	33½	24	19	13½	4½	94½
5	E. Munday, Barabba .	Ford and Sword	33	22½	19½	14	4	93
6	J. A. Campbell, Barabba	Ford	30	23	19½	14	4	90½
7	D. Wilson, Barabba ..	Ford	27½	23	19½	14	4	88
8	W. P. McPharlin, Balaklava	Sword	30	19	18½	14	4½	86
8	Bowyer Bros., Owen..	Sword	26	22	19½	14	4½	86
10	G. Uppill, Balaklava .	Sword	27½	19	19	14	4½	84
10	F. D. Lake, Owen ...	Sword	25	22	18½	14	4½	84
12	Harkness Bros, Owen	Sword and Nawaba	29	19	16	13½	4	81½
13	H. C. McPharlin, Balaklava	Waratah ...	26	20	16	14	4½	80½
	MID NORTHERN DISTRICT WHEAT CROP COMPETITION, 1934.							
	Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).							
1	J. L. Noonan, Abbeville	Sword	34	24	18	14	4	94
2	J. & D. Teakle, Gulnare	Sword	33½	24	16	14	3	90½
3	F. J. Pedler, Koolunga	Sword	28	24	20	14	4	90
4	A. Maitland, Rochester	Nabawa	30	22	20	14	3	89
5	A. Maitland, Rochester	Rance 4H ..	30	23	18	12½	3	86½
6	H. J. Crouch, Crystal Brook	Waratah ...	28	22	19	14	3	86
7	J. T. Clothier, Redhill	Sword	28½	22	19	14	2	85½
8	Spencer Bros., Koolunga	Sword	29	22	16	13	4	84
9	J. D. Dennis, Redhill	Ford, Waratah, Ranee 4H	28½	23	16	13	3	83½
10	Spencer Bros., Koolunga	Felix	28½	22	17	12	3	82½
11	A. A. Bentley, Redhill	Baldwin, Sword, Waratah	27	23	17	13	2	82
12	F. A. Wheaton, Redhill	Nabawa	28	20	17	13	3	81
	LE HUNTE DISTRICT CROP COMPETITION, 1934.							
	Judged by W. H. BROWNRIGG, H.D.A. (District Agricultural Instructor).							
1	S. L. Nottle, Yanine	Ford	30	22	18	13	4	87
2	E. H. Edmonds, Pygery	Nabawa	29	20	18	13	3	83
3	S. C. Billinghurst, Minnipa	Felix	27	20	17	13	3	80
4	W. P. Bartley, Wudinna	Nabawa	24	18	18	14½	3	77½
4	G. A. R. Scholz	Waratah ...	25	19	17	13	3½	77½
6	H. Broad, Condada...	E. Gluyas ..	23	21	17	13	3	77
7	D. Kitto, Minnipa ...	E. Gluyas, Canberra	20	18	18	12	3½	71½

MODERN METHODS OF CHANGING THE VARIETY OF FRUIT TREES.

With a view to getting a quicker crop return and avoiding probable loss of trees through attacks by wound fungi, two new methods of re-working trees are now advocated. Both methods involve a considerable amount of time and labour, but it is claimed that the advantages of the new methods outweigh the disadvantages. Briefly, the two methods are as follows:—

PEG OR PLUG GRAFT.

The whole tree should be denuded of its laterals and "side" branches—which should be completely cut away just before commencing operations, following up the leaders to a point where an ordinary whip-tongue graft might be used. This treatment might be modified somewhat where very hot conditions prevail, sufficient lateral and spur growth being left to protect the limbs from sun scald injury.

Mr. B. Fowler (Manager of the Blackwood Orchard) giving a demonstration of re-furnishing an apple tree.

The scion, cut straight across the top, should carry two or three buds, and be about 3in. to 4in. long. It should be wedge-shaped at the base, having a short bevel not more than ½in. in length, and with a bud just where the bevel cut commences. With a ⅜in. or ¼in. chisel on which the bevel has been ground down to about double its ordinary length, or with a small sharpened screwdriver, incisions are made at right angles to the growth of the limb, with a slightly downward angle. The incisions should be on the upper sides of the limbs, 9in. to 12in. apart, and of sufficient depth to allow the wedge-shaped scions to be tapped firmly into position. No white cut surface should be showing, and the base bud should be just in contact with or slightly below the bark. It is advisable to make all incisions on lime before inserting scions. The scions should then be very carefully sealed, or rendered air-tight with either grafting wax, crude petroleum jelly, and other sealing preparation. A 50-50 combination of paraffin and crude petroleum jelly makes a very useful sealing preparation, being very plastic without being sticky.

The Bark Graft.

The scion is prepared in much the same way as for the ordinary bark-graft, with a cut surface about 1in. long on one side only, with a basal bud in such a position that subsequent growths will have room for free development. A small section is sometimes cut from one side of the wood to enable better contact to be made with the cambrium.

Various types of openings may be made in the bark, but the inverted L (˥) shape will be found most convenient. As with the peg graft, 9in. to 12in. apart is a good distance to space. For this type of grafting the bark should run freely. The downward incision should not be too long. The bark should be lifted, and the scion gently forced down between the bark and the cambium. A small tack or brad is driven through the scion to keep it in position, at the same time pinning down the raised piece of bark. A convenient form of tack is that known as the bootmaker's "tingle," or a ½in. x 20 brad will do. As with the peg graft, the whole of the cut surface of the scion should be inserted beneath the bark and carefully sealed to exclude the air. With both forms of grafting it is is wise to look over them a fortnight or so after the operation and re-seal those that require attention.

Wood for scions should be cut while the tree is dormant. They may be "heeled in" in a more or less horizontal position with the ends covered by moist sand, or be kept in cool store, standing in boxes or tins with a few inches of moist sand in the bottom.

It is generally considered that the bark graft is the most successful method, but a combination of both methods would enable the work to be started earlier, the plug graft being used for the lower and larger portion of the limbs, and bark grafts for the thinner and higher sections when the bark would run freely.

It is important that any growths rising from the old variety should be removed to prevent them becomining dominant.

THE TOBACCO INDUSTRY IN AUSTRALIA.

[*A Talk Broadcast through 5CL, Adelaide, by* R. E. COURTHOPE-GILES, *Tobacco Instructor, Department of Agriculture.*]

It is estimated that the population of South Australia expends between £750,000 and £1,000,000 annually upon tobacco manufactured in its various forms, almost the whole of which is imported from the other States of the Commonwealth or from overseas.

Although South Australia has never seriously undertaken the manufacturing side of the industry, tobacco leaf has been grown in small quantities for a number of years in various parts of the State, but principally throughout the Adelaide Hills and in the South-East, around Penola, the cured leaf sold to manufacturers in the eastern States approximating 150,000lbs. weight annually.

Growers have met with varying degrees of success, as in many cases the quality of the leaf produced has been rather inferior. The principal causes of failure have been:—The unsuitability of the soil selected for the growth of the tobacco plants; unfavourable climatic conditions; unsuitable varieties selected by growers; and general lack of experience in the growing and curing of the leaf, coupled with poor preparation for marketing.

Some months ago the Commonwealth Government voted the sum of £100,000 for the purpose of establishing the tobacco-growing industry upon a sound basis, this amount to be expended at the rate of £20,000 annually over a period of five years, and allocated as follows:—The Council for Scientific and Industrial Research, £5,000; New South Wales, Victoria and Queensland, each £3,750; South Australia, Western Australia and Tasmania, each £1,250.

The latest statistics available for the financial year 1931-1932 are interesting. The respective quantities of Australian and imported leaf used during this period were 2,349,041lbs. weight and 14,075,575lbs. weight, the total used being 16,425,000lbs., valued at £7,299,344 for manufactured tobaccos. For this same period there were over 2,000 registered growers in Australia, their production being 10,160,192lbs. weight, valued at £1,114,737.

There has always been a ready market for high-grade cigarette leaf among the Australian manufacturers, and for the bright leaf suitable for fine-cut tobacco; but the demand for the dark, heavy types of tobacco is decreasing year by year throughout the Commonwealth, which also applies to the whole world.

The object of the State authorities is to endeavour to assist the growers to produce leaf of readily saleable quality at remunerative prices. To this end, the £1,250 allotted to this State will be applied annually to the best advantage by means of practical demonstrations, instruction in the latest approved methods of tobacco culture, and by conducting a series of experiments with the assistance of established growers in the most suitable areas in the Adelaide Hills and South-Eastern districts and in the Murray irrigation areas where suitable soil is to be found, and where, by means of the overhead sprinkler system of irrigation, the disadvantage of the natural low rainfall of the areas can be overcome. The leaf produced in the Murray area, around Barmera, has hitherto been grown by the ordinary method of flooding the land, and while the smoking qualities have been of a high standard, the texture of the leaf has been very poor and brittle—entirely due to the dry condition of the atmosphere. By the use of sprays it is hoped that this difficulty will be overcome, as sprays will provide the necessary moisture in a more natural form and give the required humidity. By day all exposed portions of a tobacco plant, and particularly the leaves, are absorbing carbon dioxide from the air by means of their breathing pores, and, with water, building up a store of starch and sugar.

The establishment of a successful tobacco-growing industry would be of great value to this State. Up to the present time the smokers of South Australia have spent millions of pounds upon manufactured tobacco produced elsewhere, which moneys are almost entirely, except for the retail trade, gone beyond recall.

It is now hoped, with the financial assistance provided by the Federal Parliament, and with the co-operation of the tobacco investigations being carried out by Dr. Dickson and the Council for Scientific and Industrial Research, to produce tobaccos of high quality that will satisfy smokers, and so create a demand for local products.

Owing to the drought experienced early this year the growing crops received a severe set-back, but notwithstanding this disaster, leaf of high quality has been grown, cured, graded, and baled, and the growers are now eagerly awaiting the arrival of buyers from the eastern States, who are expected to visit us at an early date.

The harvest was very late this year, and sales are in consequence not as early as usual. Reports from the other States regarding leaf sales have been quite encouraging as far as the higher grades are concerned, and it is now realised by growers that low-grade leaf can, in the majority of cases, be avoided by improved methods, and where this is not possible the only remedy is to divert their energies into some other channel.

Leaf exhibited at the Penola Show recently was of excellent quality, some 40 entries being received in the various classes. The interest of growers was greatly stimulated by the generous action of the fertiliser manufacturers, who donated valuable prizes of special tobacco fertilisers for different grades of Lemon and Bright Mahogany leaf suitable for cigarette-making and fine-cuts.

Although the entries at the Royal Spring Show in Adelaide were not so numerous some good leaf was exhibited, and it is hoped by means of slight alterations in the schedule and, if possible, by showing tobaccos manufactured from locally-grown leaf, to make the tobacco classes of more interest to the general public next year.

The most successful growers in South Australia are located in the heaviest rainfall areas of the State—between Mount Barker and Victor Harbour and in the South-East, around Penola, where something like 26in. and over are registered.

The suitability of the soil is another all-important factor. The analysis of soils taken in the Old Belt of Carolina, one of the best tobacco-growing districts in the world, reads as follows:—70 per cent. sand, 20 per cent. silt, and 10 per cent. clay. It must be fairly deep and naturally well drained, to prevent excessive acidity, overlying a clay subsoil retentive of moisture, but not impervious. The humus content must be maintained; a high percentage of humus will not detract from the value of the soil for the production of bright flue-cured tobacco, providing that the rainfall is adequate and evenly distributed.

In these latitudes the lands require as much sun as possible, and should be laid out accordingly. In the Old Belt of Carolina referred to the temperature ranges between 50 degrees and 90 degrees in the shade.

A great deal of leaf produced here in the past has been grown on heavy soil, and although giving large yields, it has not proved remunerative owing to poor colour obtained, and the consequent low prices given by the manufacturers. On the other hand, sandy country without the very necessary subsoil being within, at the most, 2ft. from the surface has also caused a number of failures by loss of the soluble content of fertilisers and the moisture necessary to plant growth.

Throughout the Adelaide Hills area suitable tobacco soils have only been found in patches up to the present time, although it is probable that, with the further clearance of scrub that is slowly but surely proceeding in the sand country, larger areas suitable for the production of the light Virginian types of leaf will be found.

Much larger areas of this type of soil are to be found in the South-East, particularly in the ridge of hills which runs parallel with the Victorian border, and are generally of a sandy loam nature.

In the past it has been the custom here to sow the tobacco seed beds in October and carry out the field planting during December. This season an effort has been made to take more advantage of the warm summer months to assist in the ripening process, and in consequence the seed beds were sown very much earlier. The majority of growers hope to finish field planting before the middle of November. Another advantage obtained by early planting is to lessen the risk of an outbreak of Downy Mildew or Blue Mould disease, as it is generally known, for it has seldom made its appearance before the latter half of November, and then as a rule in the seed beds where conditions are most favourable to its contraction and spread by the Blue Mould parasite.

The necessary tobacco fertilisers are obtainable from the local distributors, and can be made up to suit particular requirements, and any advice required as to the amounts and methods of application can be obtained from the Agricultural Department.

The soil should be worked to a fine tilth, and all possible moisture conserved. After planting in the field on the check row system, which, with 3ft. spacing, will take approximately 4,800 plants per acre, intensive cultivation should be carried on during the period of growth.

The lower leaves coming in contact with the ground are valueless and should be removed as soon as the plants commence to make steady growth; this operation is known as "priming." When the plant is approaching maturity after being in the field for about three months, and is approaching the flowering stage, they should be topped. This will force the ripening of the leaf, and after a period of ten days it should be possible to commence the harvesting operations. The leaves ripen from the bottom upwards. They must be picked with great care to prevent bruising and discolouration, and be of uniform ripeness, if a satisfactory cure is to be obtained. This is rather a long process, and perhaps I may have an opportunity of saying something further on the subject at a future date.

SEED WHEAT FROM CROP COMPETITIONS.

In Wheat Competitions conducted in the undermentioned Districts the following Competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

CENTRAL—

A. H. Wolf, Rosedale—Pine Head.
L. W. George, Wasleys—Sword.
Matters and McCabe, Wasleys—Sword.
W. K. Oliver, Wasleys—Sword.
N. J. Griffiths, Salisbury—Bencubbin, Ghurka, Dundee.
Dawkins and Aunger, Gawler—Sword.
Kerr and Cliff, Waratah—Waratah.
W. F. Leak, Willaston—Pine Vale, Quality, Nabawa.

JERVOIS—

W. Jericho, Cleve—Waratah.
J. Brus and Sons, Mangalo—Sword.
L. H. and D. H. Hogg, Darke's Peak—Nabawa, Waratah, Sword.
M. H. Burton, Rudall—Waratah.
F. I. Kestel, Rudall—Bencubbin.
D. C. McCallum, Rudall—Waratah.

BUXTON—

H. Cant, Kimba—Sword.

SOUTHERN—

S. Wachtel, Palmer—Sword.
M. Wachtel, Palmer—Nabawa.
L. H. Wachtel, Palmer—Nabawa.
J. O. Bottroff, Palmer—Sword, Nabawa.
G. W. Faehrmann, Palmer—Nabawa.
H. B. Scheer, Mannum—Sword.
C. A. Whittlesea, Langhorne's Creek—Late Gluyas.
J. Rzeszskowski and Mattner Bros., Finniss—Sword.
Rankine Bros., Strathalbyn—Nabawa.
H. A. Eckert, Belvidere—Sword.
C. Brook, Woodchester—Petatz Surprise, Nabawa.
H. H. Cross, Woodchester—Ford.
E. T. and L. Jaensch, Hartley—Ghurka, Bencubbin.
Mrs. E. Hartmann, Monarto South—Dan, Sword.
Thomas Bros., Monarto South—Nabawa, Sword.

SEED WHEAT FROM CROP COMPETITIONS—*continued.*

SOUTHERN—*continued.*

P. B. Frahn, Monarto—Currawa.
Frahn Bros., Monarto—Sword, Nabawa.
J. F. C. Paech, Callington—Dan, Nabawa.
C. Brook, Woodchester—Comeback.

JUDGE'S NOTE.—*"Sword" contains the mixed strains typical of this variety, but because of its prominence and the demand for seed, it has been recommended until such time as a more fixed type is available.*

ALBERT—
G. H. Sutherland, Copeville—Ranee.

ALFRED—
W. Paull & Sons, Alawoona—Gallipoli, Ranee.
A. C. Webb, Paruna—Sword, Nabawa, Baringa.
G. J. Zimmermann, Meribah—Sword.
E. M. Edwards, Paruna—Ranee.

BALAKLAVA—
Jas. Campbell, Barabba—Sword and Ford.
J. A. Campbell, Barabba—Sword.
R. P. Anderson, Upper Wakefield—Sword.
W. Ryan, Halbury—Sword.
Bowyer Bros., Owen—Sword.
G. Uppill, Balaklava—Sword.
E. Munday, Barabba—Sword.
D. Wilson, Barabba—Ford.

WESTERN—
L. C. Roberts, Port Pirie—Currawa.
H. G. Munday, Merriton—Waratah.
E. T. Franks, Box 157, Port Pirie—Currawa.
J. H. Holman, Telowie Creek—Carmichael's Eclipse and Gallipoli.

SOUTHERN YORKE PENINSULA.
H. Polkinghorne, Minlaton—Sword.
W. G. Boundy, Minlaton—Ford.
A. E. Brechin, Curramulka—Sword.

MID-NORTH—
A. Maitland, Rochester—Nabawa.
F. J. Pedler, Koolunga—Sword, Ranee, 4H, Bencubbin.
F. A. Wheaton, Redhill—Nabawa.
J. T. Clothier, Redhill—Sword.
A. H. Bentley, Redhill—Sword.
H. J. Crouch, Crystal Brook—Waratah.
J. D. Dennis, Redhill—Ranee 4H.
J. L. Norman, Gulnare—Sword.

NOTHERN YORKE PENINSULA—
T. Rodda, Boors Plains—Sword.
J. H. Bussenchutt, Paskeville—Sword.
G. E. & H. M. Meier, Paskeville—Sword.

FAR NORTHERN—
H. G. Kupke. Morchard—Free Gallipoli.
A. Piggott, Morchard—Ford.
D. J. Crocker, Orroroo—Waratah.
W. G. Gregurke, Wepowie—Felix.
T. F. Orrock, Wepowie—Ranee 4H.
E. H. Hampel, Terka—Ranee 4H, Currawa.

LE HUNTE—
T. L. Nottle, Yanince—Ford, Merridin.
E. H. Edmonds, Pygery—Nabawa.
S. C. Billinghurst, Minnipa—Felix, Faun, Early Gluyas, Merridin, Nabawa.
W. P. Bartley, Wudinna—Nabawa.

Oats.

Mr. W. C. Johnston advises that he inspected a crop of New Zealand Cape Oats on the farm of Mr. F. H. Wolf, of Rosedale, which he reports as being suitable for seed.

CONTROL METHODS USED AGAINST LOCUSTS AND GRASSHOPPERS.

[By J. DAVIDSON, D.Sc., Waite Agricultural Research Institute, University of Adelaide.]

Owing to the widespread plague of grasshoppers in South Australia during 1933-34, it has been suggested to me that a short survey of the usual control measures adopted against grasshoppers and locusts in various countries would be helpful to farmers and others.

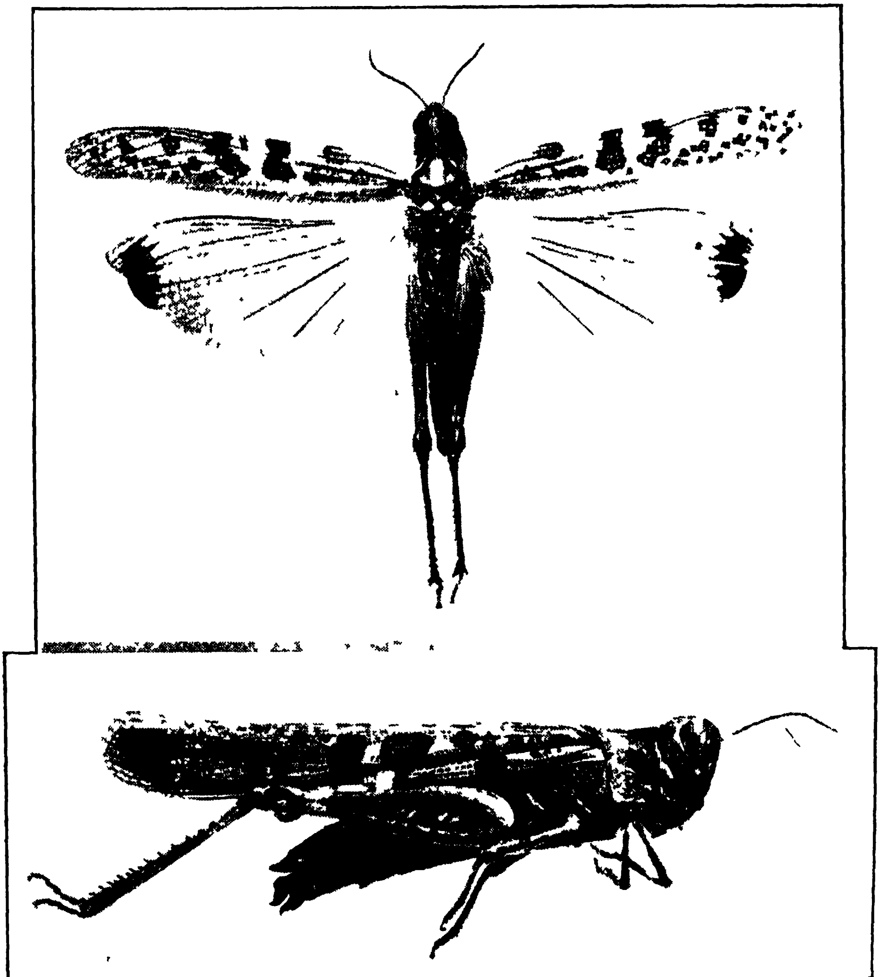


Fig. 1.—The plague grasshopper (Chortoicetes terminifera, Walk.) in South Australia, March, 1933.

The species causing the present plague is known as the "wandering grasshopper" (*Chortoicetes terminifera*). The infestation extends over South Australia, portions of the northern districts of Victoria, and western districts of New South Wales. More than one species may be involved in this widespread outbreak. The outbreaks occur at infrequent intervals of several years. The grasshoppers occur

in swarms which vary considerably in size. Compared with the locusts of the old world, the swarms are smaller and their range of migration is more restricted, so that organisation for a control campaign can be made on a more local basis.

Investigations on the ecology of the species in South Australia are being made by the Department of Entomology of the Waite Institute, in co-operation with the State Department of Agriculture. The present article gives a short general account of the chief measures which are adopted in various countries in order to reduce losses due to outbreaks of grasshoppers and locusts; many of them are applicable to the conditions existing in South Australia.

Grasshoppers and locusts belong to the same family of insects. With the former, many species live as solitary individuals, although actually they may be present in large numbers scattered over pasture areas; other species are gregarious in habits and move about in swarms. The habits of these gregarious, migrating species closely resemble those of true locusts. In general, however, locust swarms are larger and their range of migration is much more extensive.

The life-history of migrating grasshoppers and locusts is simple. The winged females lay their eggs in batches in the ground, in suitable situations, to a depth of about 2in. From these eggs, wingless hoppers hatch out; they gradually increase in size and eventually become winged males and females. The wingless hoppers and winged forms migrate in swarms, which latter vary considerably in size. The winged swarms congregate on suitable areas in order to lay eggs; these areas are known as "egg-beds," and vary in extent from a few square yards to several acres according to the size of the swarms.

The characteristic feaure of these insects is their periodic occurrence in plague numbers. In 1921, B. P. Uvarov advanced a theory to explain the reason for these periodic outbreaks; it is known as the "phase theory." According to the "phase theory" a gregarious species may be endemic in particular regions in a non-gregarious or solitary phase. Under certain environmental conditions not yet clearly understood, gregarious individuals develop in these permanent or endemic areas; these individuals multiply and form into swarms which migrate into surrounding areas. These secondary areas are only infested for temporary periods. The extent and intensity of the migration appear to be greatly influenced by weather factors. The phase theory fits well with the behaviour of certain species of locusts.

The exact locations of the permanent or endemic areas of the "wandering grasshopper" in South Australia are not known. They appear to be situated in the dry northern areas of the State, close to the line of the 10in. annual isohyet. The general direction of migration appears to be to the south. In any case, observations made during the present invasion and those recorded during previous outbreaks show that the occurrence of the insects in numbers in the agricultural areas of the State is only temporary.

It is evident that a study of the ecology of the species of grasshoppers involved in the present plague in Australia is necessary. It is also important that research should be carried out on the causes underlying their periodic occurrence in plague numbers.

1. ORGANISATION OF CONTROL MEASURES.

When a mass outbreak of grasshoppers is indicated, it is essential that control measures should be organised on a communal basis if satisfactory control is to be obtained. One important aspect of such an organisation should be the survey of infested areas so as to demarcate situations where eggs have been deposited by flying swarms. A skeleton organisation should be maintained in those agricultural areas liable to infestation, so that early control measures can be taken when an invasion is threatened. Under South Australian conditions the district council appears to be the best unit for a control organisation. It is important that occupiers of land should mark and report areas on their property where the

swarms of winged insects have laid eggs. If these "egg-beds" are defined, preparations can be made for dealing with the hoppers hatching out from them. Extensive "egg-beds" may occur on unoccupied land, surveyed roads, or State property; these should be dealt with by local councils or State organisations.

The aim in any control compaign should be the destruction of the swarms of wingless hoppers. It is generally recognised that control becomes increasingly difficult when the insects attain the winged stage. Any commonsense, practical methods may be employed in order to destroy swarms. In an organised State-wide campaign, however, certain methods are more practical than others. Of these, spraying with poison sprays, or the distribution of poison bait are methods which are widely adopted. The cost of materials and appliances used in these campaigns may be borne by the Government or by district authorities; the necessary labour can generally be arranged by owners of the land or by district councils.

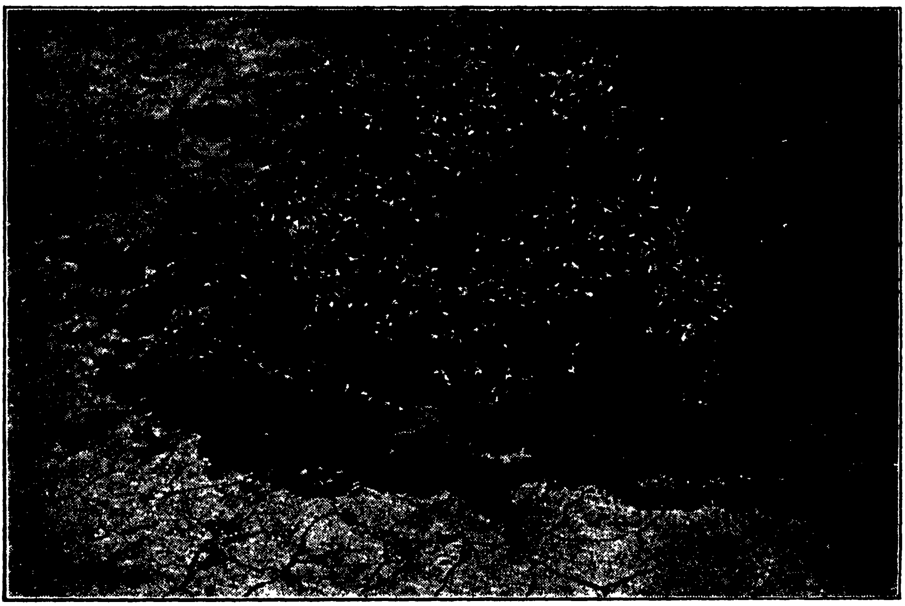


Fig. 2.—The plague grasshopper; wingless hoppers in shelter of saltbush during windy weather. North of Peterborough, S.A., Nov. 9th, 1934.

The amount of money which may be reasonably expended on control measures will depend on the value of the crops in the area threatened by invasion. It is evident that labour may be a heavy item of expenditure unless free co-operation is developed in the districts concerned.

2. SURVEY OF CONTROL MEASURES GENERALLY EMPLOYED.

Various control methods are widely practised in many countries; certain of them are suitable for use in organised campaigns, others may be employed by smaller groups of workers.

(a) Destruction of Eggs in "Egg-beds."

The insects lay their eggs in batches in the ground to a depth of about 2in.; the "egg-beds" may be a few square yards to an acre or more in extent. Where practicable, shallow ploughing or harrowing over these areas will expose the eggs to their natural enemies, such as birds, &c., and also to the influence of weather. With some species, in certain countries, the egg-pods are collected and destroyed.

(b) Destruction of Hoppers.

(1) Mechanical methods, such as destroying the hoppers by the use of rollers, chain or brush harrows, or other implements, are adopted. Their use is restricted to suitable situations and the efficiency of the method is unreliable.

(2) Hopper-catching machines are sometimes used and various types have been designed. While they may be useful in local flat situations, their application is restricted and a high degree of control is not obtained.

(3) The distribution of dry material over an area where a swarm of hoppers is present is commonly practised; the hoppers tend to shelter in the material at night and the latter can be fired at an appropriate time. The limitations of the the method are obvious. Flame-throwers of various patterns have been used, a common form being of the knapsack sprayer type; kerosene and fuel oil may be used as fuel. The method is convenient for small swarms of hoppers; owing to fuel costs it has only a restricted application.

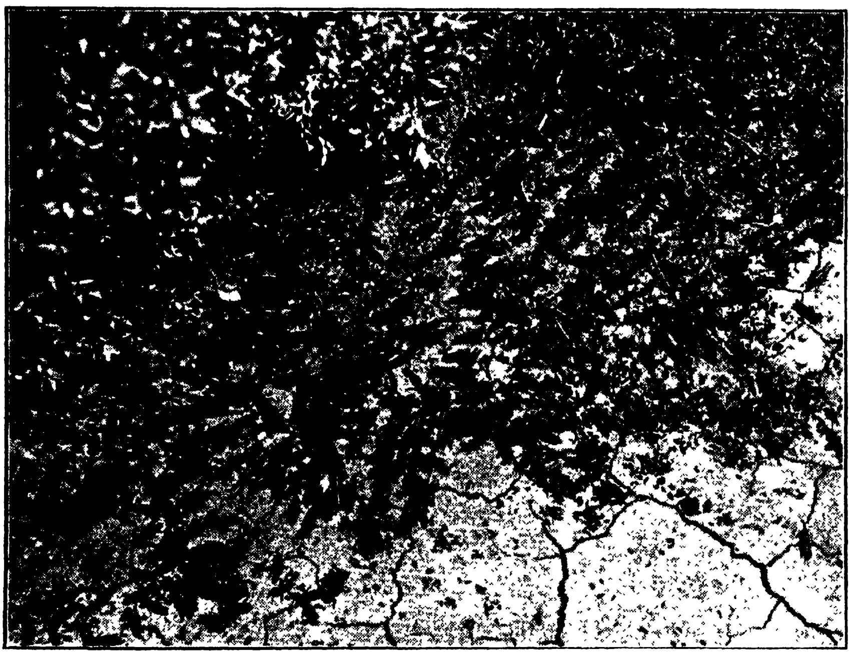


Fig. 3.—The plague grasshopper; wingless hoppers in country north of Peterborough, S.A., Nov. 9th, 1934. Note character of soil surface.

(4) The method of digging trenches to intercept swarms of advancing hoppers is widely used in certain countries. It is particularly appropriate against those species in which the hoppers advance steadily and do not readily change their direction; the hoppers may be destroyed in large numbers by this method. Following on the method evolved originally in Cyprus, barriers or screens made with suitable material are used in order to direct swarms of hoppers into pits or trenches. Sheets of smooth galvanized iron or zinc about 18in. wide have proved effective for this purpose. Barriers may be used to protect a crop from an advancing swarm of hoppers; the latter may be destroyed as they bank up against the barrier, or they may be directed into trenches. The use of the method will depend upon local conditions. Labour costs may be high where frequent changes of the position of the barriers are necessary, owing to the irregular movements of the swarm of hoppers. In suitable situations deep plough furrows will retard the advance of a swarm of hoppers into a crop.

(5) Liquid contact sprays for killing young hoppers are frequently used; they are not very effective against older hoppers. Owing to the strength of the spray required, the method is costly, and contact insecticides, such as kerosene emulsions, are harmful to vegetation. Kerosene-soap emulsions, mineral oils, and carbolic-soap emulsions may be used for spraying newly-emerged hoppers on the "egg-beds."

(6) The use of arsenical compounds as stomach poisons in the form of sprays and baits have been widely developed in many countries. Spraying has a limited application in areas where dry farming is practised; it may be used to advantage where water is readily available and the occupier of the land has adequate equipment. It is particularly useful where the herbage growth is vigorous, since baits are not suitable in such situations.

Paris green and sodium arsenite are chiefly used as the poisonous ingredients in these sprays. Molasses added to the spray enhances its attractiveness, but its presence is not essential. The following poison spray has been shown to be effective in Australia:—

Arsenite of soda	1lb.
Molasses	2lbs.
Water	16galls.

The spray should be applied on a strip of vegetation about 30ft. wide in front of the advancing swarm of hoppers. It may be also sprayed directly on to the hoppers, since it kills both by contact and as a stomach poison. It is necessary to know the arsenious oxide content of the arsenite of soda which is used; the above formula refers to an 80 per cent. arsenious oxide content.

Other forms of arsenic, such as white arsenic, are sometimes used. Stock should not have access to sprayed areas. Sprays containing soluble arsenic are liable to burn foliage. The disadvantages of the spraying method are obvious, but with heavy pasture growth good results should be obtained. In the case of a pasture crop like lucerne, it is advisable to protect the crop by spraying a barrier area around it, rather than spraying the crop itself.

(7) The poison bait method is widely used. A bait consists of an inert carrier, a poison, and an attractive substance. Bran is a useful and efficient carrier, but other convenient materials such as chaff, chopped fodder, or sawdust may be used where bran is not available. The carrier should break readily into small pieces when the bait is distributed; it must not deter the insects from feeding on the bait. Bran has many advantages as a carrier and its high efficiency offsets its cost. Experiments should be made with suitable local materials.

Arsenical poisons have given the most satisfactory and consistent results; Paris green and sodium arsenite are generally used. The soluble forms of arsenic compounds kill the insects quicker than the insoluble forms. The solubility of certain compounds in 100 parts of cold water are given below:—

White arsenic (Arsenious oxide) As_2O_3 . . .	1.2 parts.
Sodium arsenite Na_2HAsO_3	Very soluble.
Sodium arsenate $Na_3AsO_4 12H_2O$	26.7.
Calcium arsenate	Insoluble.
Lead arsenate	Insoluble.

With soluble poisons the solution of the poison is poured over the bait carrier and thoroughly mixed; with insoluble poison the bait should be mixed dry with the carrier and then made into a mash with an appropriate amount of water.

The attractive agent in the bait greatly increases its efficiency. The evidence regarding the value of the use of molasses is conflicting; where this material cannot be obtained it would appear to be justifiable to use the bait without it. In addition to being attractive to the insects, molasses assists in keeping the bait

moist for a longer period. Damp baits are more attractive than dry ones; salt is sometimes added to baits in order to assist in keeping them damp.

Other substances have been used in baits as attractants, such as crushed fruits. Further experiments are necessary on this aspect of baits.

The following fomula has proved to be an effective bait in Australia:—

Arsenite of soda	½lb.
Molasses	4lbs.
Bran	24lbs.
Water	2½galls.

The arsenite of soda is dissolved in the water and the molasses added to the solution. The mixture is sprinkled over the bran, the whole being thoroughly mixed to form a crumbly mash. The amount of arsenious oxide present in the arsenite of soda is important; the formula refers to an arsenious oxide content of 80 per cent.

The bait is scattered over an area of about 30ft. wide in front of advancing swarms of hoppers. The amount of bait required per acre will vary with the character of the area. About 10lbs. of bait (dry) should be sufficient, but in practice the amount used may be greater than this; if laid too thickly there is undue wastage of bait. The risk of poisoning stock is negligible if the poison bait is spread thinly as directed. Operators handling poison bait must observe commonsense precautions. Baits should be spread early in the morning; the hoppers become more active later in the day as the temperature increases. On cold days baiting is not so effective, since the hoppers are sluggish.

(8) The application of poison dusts, both as stomach poisons and contact poisons, has been widely developed in several countries against certain insect crop pests. During the past few years experiments have been made on the use of arsenical dusts for the control of grasshoppers and locusts. This work is in an experimental stage and would appear to have a promising future.

A dust consists of an inert carrier and the active poison. Lime, gypsum, talc, sulphur, &c., are generally used as carriers. Arsenical compounds have been chiefly used as the poison.

Appropriate dusting machines are necessary. For small swarms the knapsack or hand rotary duster may be suitable. For large areas the use of the aeroplane is gradually being developed; suitable apparatus for distributing the dust is attached to the aeroplane.

The aeroplane method appears to be particularly suitable for large areas of unoccupied or sparsely-inhabited country. It will have only a restricted application in settled areas, owing to the difficulty of efficient localisation of the dust cloud. The latter is considerably affected by weather conditions, particularly wind.

Where swarms of hoppers are scattered, as is the case of the wandering grasshopper in South Australia, the areas requiring treatment would have to be clearly defined in order to reduce wastage in materials and loss of time. In order to manoeuvre the plane over these areas considerable ground organisation would be necessary. Under these conditions the method would be costly.

Experiments have been carried out more recently with a view to testing the effect of dusting flying swarms of locusts with dusts containing sodium arsenite. It is thought that the dust will effectively kill the insects by contact.

(9) Few experiments have been made on the effect of poison gases against grasshopper swarms. The method can have only a restricted application owing to the danger to animal and plant life.

(c) Destruction of Winged Swarms.

Certain of the methods referred to in section (b) may be used. Of these, the use of poison baits and poison sprays are generally adopted. In some instances destruction of winged swarms when resting at night is possible.

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during October.	Per Cow during October.	Per Cow December to October.	Per Herd during October.	Per Cow during October.	Per Cow December to October.	
			Lbs.	Lbs.	Lbs.	Lbd.	Lbs..	Lbs.	%
6/B ..	19	18	13,950	734·21	5,303·86	653·72	34·41	256·13	4·69
6/C ..	21·58	15·13	13,737	636·56	5,212·57	566·93	26·27	219·56	4·13
6/H .	24	20	19,545½	814·39	5,143·86	932·60	38·86	246·91	4·77
6/Y ..	15·61	8·23	5,897½	377·79	3,995·83	214·76	13·76	169·34	3·64
6/Ii ..	21	11·16	8,237½	392·26	6,286·19	370·31	17·63	271·51	4·50
6/Ll .	25	16·81	14,886	595·44	5,060·83	550·29	22·01	191·89	3·70
6/Oo .	18·77	13·45	12,367	658·86	6,477·32	488·88	26·05	288·38	3·95
6/Pp .	14	10·13	9,216½	658·32	5,366·70	386·26	27·59	268·07	4·19
6/Rr	27	18·52	19,329½	715·91	7,148·07	824·99	30·56	301·24	4·27
6/Tt .	19·97	15·19	12,543	628·09	6,822·10	551·59	27·62	302·16	4·40
6/Xx	26·74	19·74	15,493	579·39	6,124·09	706·91	26·44	267·42	4·56
6/Zz..	30	24·29	13,522½	450·75	5,640·97	563·14	18·77	267·34	4·16
6/Bbb	23	17·90	16,160½	702·63	6,565·79	639·39	27·80	284·31	3·96
6,Ccc	20	15·29	13,663	683·15	5,677·66	531·35	26·57	237·69	3·89
6/Ddd	27·29	23·03	19,776	724·66	6,571·60	809·46	29·66	273·65	4·09
6/Eee	26·61	20·65	23,821	895·19	7,565·10	957·06	35·97	307·75	4·02
6/Fff	23	18·10	16,725	727·17	7,022·88	646·72	28·12	290·06	3·87
6/Ggg	29	22·06	21,867½	754·05	7,327·43	797·44	27·50	276·74	3·65
6/Iii .	24·61	18·16	12,090	491·26	7,108·96	435·95	17·71	291·06	3·61
C/Jjj .	25	23·94	23,385½	935·42	6,598·99	1,033·43	41·34	304·32	4·42
6/Kkk	35	24·52	24,943½	712·67	7,425·32	912·24	26·06	291·46	3·66
6/Lll	23·97	19·58	17,117½	714·12	5,694·91	676·28	28·21	252·42	3·95
					May-Oct.			May-Oct.	
6/Mmm	9·13	7·03	7,906½	865·98	5,141·84	325·53	35·65	195·64	4·12
Means	23·01	17·43	15,486·12	672·95	6,314·06	633·71	27·54	269·96	4·09

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during October.	Per Cow during October.	Per Cow July to October.	Per Herd during October.	Per Cow during October.	Per Cow July to October.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	7	3·52	3,567½	509·64	1,318·30	169·78	24·25	66·93	4·76
7/L ..	24·55	19·29	18,184½	740·71	2,103·94	803·01	32·71	92·67	4·42
7/P ..	26	24	20,475½	787·52	2,718·65	965·44	37·13	130·52	4·71
7/Aa .	25·10	23·97	20,480½	815·95	2,282·94	908·42	36·19	101·35	4·44
7/Tt .	13·81	11·97	11,763	851·76	2,901·28	487·67	35·31	128·23	4·15
7/Uu	27	25·03	16,975	628·70	2,274·52	695·11	25·74	97·15	4·09
7/Xx	22·06	18·48	13,862½	628·46	2,370·72	761·72	34·53	123·78	5·51
7/Bbb	50·48	38	30,427½	602·76	2,232·92	1,291·37	25·58	98·16	4·24
7/Ccc	23	19·65	16,853½	732·76	2,051·99	712·57	30·98	88·46	4·23
7/Ddd	13	12·39	10,064	774·15	2,512·18	487·42	37·49	120·85	4·84
7/Eee	10	9·52	6,785½	678·55	2,531·90	366·55	36·66	129·01	5·40
7/Ggg	17	12·48	7,140½	420·03	1,314·22	335·11	19·71	60·38	4·69
7/Hh	12	12	9,625½	802·12	2,851·44	327·40	27·28	101·55	3·40
7/Iii .	16	15·29	18,988	1,188·38	2,591·16	633·26	39·64	91·25	3·34
7/Jjj	11	9·10	5,440	494·54	2,020·81	261·67	23·79	95·83	4·81
7/Kkk	34	25·48	23,353	687·01	1,816·59	1,183·25	34·81	91·72	5·07
7/Lll	21	18·81	15,785½	751·69	2,207·48	790·96	37·66	110·84	5·01
7/Mmm	14	9·94	6,613½	472·39	1,526·41	340·20	24·30	77·35	5·14
Means	20·39	17·16	14,243·61	698·60	2,212·28	640·05	31·39	100·93	4·49

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during October.	Per Cow during October.	Per Herd during October.	Per Cow during October.	
			Lbs.	Lbs.	Lbs.	Lbs.	%
5/C	33	29·68	19,848½	601·49	1,048·48	31·77	5·28
5/D	30	28	19,173½	639·12	983·64	32·79	5·13
5/E	38	32·45	23,134½	608·80	1,196·90	31·50	5·17
5/R	70·77	67·61	49,115	694·01	2,128·22	30·07	4·33
5/Z	31	31	23,684	764·00	1,193·78	38·51	5·04
5/Ee	23	22·26	16,046½	697·67	750·48	32·63	4·68
5/Kk	16	11·71	9,366	585·37	479·06	29·94	5·11
5/Ww	20	19·97	12,825	641·25	613·45	30·67	4·78
5/Xx	20	20	13,268	663·40	667·34	33·37	5·03
5/Yy	11	10·06	7,293½	663·04	373·84	33·99	5·13
5/Aaa	17·77	15·32	12,146	683·51	608·12	34·22	5·01
5/Bbb	17	16	11,392½	670·15	578·45	34·03	5·08
5/Ddd	25·23	24·23	24,646	976·84	966·59	38·31	3·92
5/Eee	14	11	8,261½	590·11	381·04	27·22	4·61
5/Fff	9·35	7·48	6,589½	704·75	305·01	32·62	4·63
5/Ggg	10	6·32	5,843½	584·35	240·50	24·05	4·12
5/Hhh	12·77	10·10	10,025	785·04	408·26	31 97	4·07
Means	23·46	21·36	16,038·74	683·54	760·19	32·40	4·74

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during October.	Per Cow during October.	Per Cow March to October.	Per Herd during October.	Per Cow during October.	Per Cow March to October.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A	25	19·61	10,471	418·84	3,761·01	561·50	22·46	203·38	5·36
9/B	15·19	10·10	6,189½	407·47	3,099·05	297·93	19·61	146·89	4·81
9/C	12·13	10·58	9,103½	750·48	3,587·00	397·56	32·77	160·44	4·37
9/D	24	17·03	13,935½	580·64	4,190·22	737·68	30·74	226·65	5·29
9/E	20	16·77	17,106½	855·33	3,731·10	865·40	43·27	179·55	5·06
9/F	20	20	17,158½	707·03	4,199·81	769·33	32·27	178·58	4·48
9/G	33·39	22·55	23,282½	697·29	3,481·40	1,224·61	36·68	183·73	5·26
9/H	20·45	19·29	19,376	947·48	5,397·61	847·69	41·45	228·85	4·37
9/I	36·29	35·61	29,286½	807·01	2,744·63	1,210·71	33·36	112·71	4·13
9/J	61	46·10	31,902	522·99	2,632·96	1,173·84	19·24	109·64	3·67
9/K	23·77	20·39	12,445	523·56	2,548·73	576·22	24·24	121·98	4·63
9/L	29	23·77	14,192	489·38	2,931·65	563·64	19·44	114·60	3·97
9/M	19	14·71	9,864	519·16	857·31	422·30	22·23	37·59	4·28
9/N	37	32·19	19,019½	514·04	3,760·86	804·07	21·73	153·29	4·23
9/O	24·16	21·74	20,339	841·84	3,546·39	860·13	35·60	157·10	4·23
9/P	48·03	44·55	31,073½	646·96	3,148·26	1,459·28	30·38	144·82	4·70
					April-Oct.			April-Oct.	
9/Q	21·06	13·81	9,007	427·67	2,803·48	418·10	19·85	132·72	4·64
9/R	9	8	8,168½	907·61	2,589·66	365·94	40·66	123·37	4·48
					May-Oct.			May-Oct.	
9/S	11	7·61	9,959½	905·41	3,345·40	435·11	39·56	146·94	4·37
9/T	14·65	14·52	11,244½	767·54	3,844·82	549·86	37·53	177·75	4·89
9/U	15	12·77	9,628½	641·90	2,631·59	504·51	33·63	138·49	5·24
					June-Oct.			June-Oct.	
9/V	10	9·42	5,507	550·70	2,292·15	313·10	31·31	121·33	5·69
					Sept.-Oct.			Sept.-Oct.	
9/W	24·16	22·45	24,388½	1,009·42	1,934·01	1,002·91	41·51	81·79	4·11
Means	24·06	20·16	15,767·30	655·45	3,450·33	711·37	29·57	158·08	4·51

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.		
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	146		
	2	140		
	3	29	315	
	4	--		
	5	136		
	6	115	251	
				566
A. H. Matthews, Bridgewater	7	120		
	8	125		
	9	139	384	
	10	146		
	11	dead		
	12	45	191	
				575
G. W. T. Symes, Echunga	13	126		
	14	27		
	15	142	295	
	16	75		
	17	122		
	18	129	326	
				621
E. B. Gliddon, Yundi	19	140		
	20	95		
	21	dead	235	
	22	dead		
	23	80		
	24	50	130	
				365
T. Cleaver, Bridgewater	25	129		
	26	91		
	27	87	307	
	28	87		
	29	103		
	30	122	312	
				619
J. E. Assender, Echunga	31	110		
	32	116		
	33	94	320	
	34	82		
	35	90		
	36	74	246	
				566
S. Hill, Bridgewater	37	131		
	38	83		
	39	184	398	
	40	133		
	41	dead		
	42	94	227	
				625
W. Restall, Echunga	43	155		
	44	153		
	45	dead	308	
	46	115		
	47	111		
	48	131	357	
				665
C. Guthridge, Yundi	49	126		
	50	147		
	51	121	394	
	52	15		
	53	53		
	54	103	171	
				565
S. Lambert, Echunga	55	128		
	56	28		
	57	dead	156	
	58	36		
	59	104		
	60	93	233	
				389
A. Young, Bridgewater	61	91		
	62	148		
	63	105	344	
	64	131		
	65	113		
	66	137	381	
				725
D. J. Foxwell, Echunga	67	135		
	68	117		
	69	110	362	
	70	96		
	71	127		
	72	41	264	
				626
J. C. Normandale, Yundi	73	99		
	74	134		
	75	127	360	
	76	112		
	77	114		
	78	122	348	
				708
L. W. Sando, Echunga	79	150		
	80	52		
	81	112	314	
	82	143		
	83	149		
	84	103	395	
				709
J. O. Marshall, Yundi	85	144		
	86	168		
	87	52	364	
	88	dead		
	89	123		
	90	106	129	
				593
Murray Powell, Jupiter Creek	91	79		
	92	120		
	93	131	330	
	94	dead		
	95	139		
	96	68	207	
				537

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
	97	122	
	98	139	
	99	119	380
S. Bridge, Yundi	100	80	
	101	dead	
	102	133	213
			593
	103	80	
	104	97	
	105	127	304
C. T. Rodger, Echunga	106	131	
	107	141	
	108	dead	272
			576
	109	32	
	110	13	
	111	150	195
R. H. Smith, Yundi	112	25	
	113	106	
	114	36	167
			362
	115	33	
	116	83	
	117	136	242
Willow Bend Stud Poultry Farm, North Walkerville	118	—	
	119	51	
	120	95	146
			388
	121	28	
	122	102	
	123	137	267
C. MacDonald, Echunga	124	142	
	125	122	
	126	103	367
			634
	127	157	
	128	89	
	129	146	392
T. R. Smart Yundi	130	98	
	131	dead	
	132	152	250
			642
	133	68	
	134	110	
	135	126	304
Raymoor Poultry Farm, William Street, Kilkenny	136	137	
	137	100	
	138	38	275
			579
	139	85	
	140	122	
	141	174	381
B. R. Whittington, Yund	142	80	
	143	76	
	144	128	284
			665
	145	2	
	146	161	
	147	97	260
W. A. Hassal, 11, Rosetta Street, Rosewater	148	36	
	149	108	
	150	dead	144
			404

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
	151	41	
	152	83	
	153	75	199
H. F. Muirson, Yundi	154	57	
	155	133	
	156	98	288
			487
	157	3	
	158	118	
	159	97	218
K. Pennack, Pooraka	160	138	
	161	74	
	162	124	336
			554
	163	109	
	164	112	
	165	143	364
C. A. L. Sandstrom, Yundi	166	144	
	167	125	
	168	48	317
			681
	169	39	
	170	58	
	171	72	169
G. A. Bielby, Pooraka	172	116	
	173	dead	
	174	99	215
			384
	175	110	
	176	93	
	177	133	336
W. M. Field, Yundi	178	48	
	179	107	
	180	126	281
			617
	181	152	
	182	155	
	183	123	430
T. Duhring, Mallala	184	126	
	185	87	
	186	94	307
			737
	187	140	
	188	dead	
	189	50	190
W. R. Hedger, Yundi	190	85	
	191	160	
	192	dead	245
			435
	193	125	
	194	137	
	195	112	374
A. & H. Gurr, Bradbury	196	146	
	197	159	
	198	141	446
			820
	199	132	
	200	90	
	201	101	323
J. V. McGinnis, Yundi	202	83	
	203	99	
	204	18	200
			523

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.		
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	149		
	206	121		
	207	151	421	
	208	88		
	209	91		
	210	148	327	
				748
W. C. Jones, Yundi	211	7		
	212	85		
	213	147	239	
	214	103		
	215	123		
	216	43	269	
				508
Langmaid & Bettison, Parafield, Salisbury	217	dead		
	218	95		
	219	46	141	
	220	102		
	221	130		
	222	114	346	
				487
A Jarvis, Yundi	223	68		
	224	89		
	225	53	210	
	226	129		
	227	100		
	228	146	375	
				585
S. Eykes, Clarendon	229	57		
	230	dead		
	231	126	183	
	232	137		
	233	143		
	234	108	388	
				571
Woodbury Poultry Farm, Stirling East	235	89		
	236	17		
	237	121	227	
	238	dead		
	239	54		
	240	71	125	
				352
V. F. Gameau, Findon Road, Woodville	241	58		
	242	6		
	243	89	153	
	244	dead		
	245	92		
	246	103	195	
				348
Geo. Lomax, Yundi	247	113		
	248	24		
	249	105	242	
	250	56		
	251	dead		
	252	69	125	
				367
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	117		
	254	162		
	255	53	332	
	256	20		
	257	11		
	258	29	60	
				392

Competitor.	Bird No.	First Grade Eggs Progressive Totals. to Dec 1st, 1934.		
W. R. Williams, 28, Avenue Road, Frewville	259	168		
	260	75		
	261	5	248	
	262	124		
	263	152		
	264	152	428	
				676
R W. McAllister, Yundi	265	73		
	266	69		
	267	126	268	
	268	67		
	269	147		
	270	90	304	
				572
G W. Sykes, Yundi	271	67		
	272	75		
	273	114	256	
	274	142		
	275	127		
	276	92	361	
				617
A. P. Urlwin, Balaklava	277	140		
	278	114		
	279	133		
		387		
A. V Dupen, Melton Street, Glenelg	280	127		
	281	169		
	282	92		
		388		
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	93		
	284	163		
	285	112		
		368		
Thomas & Elson, Clifton Street, Hawthorn	286	107		
	287	61		
	288	110		
		278		
J. H. Dowling, Glossop, River Murray	289	92		
	290	135		
	291	129		
		356		
E. Pape, Wynarka	292	dead		
	293	27		
	294	86		
		113		
L. S. Ekers, Mount Jagged Farm Mount Compass	295	120		
	296	105		
	297	122		
		347		
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	129		
	299	144		
	301	150		
		423		
L. R. Badcock, 77, Findon Road, Woodville	301	79		
	302	70		
	303	111		
		260		

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	111	
	305	130	
	306	155	
		396	
Gallagher & Aslin, Pooraka	307	160	
	308	126	
	309	112	
		398	
R. C. Crittenden, William Street, Kilkenny North	310	135	
	311	112	
	312	81	
		328	
C. H. Lines, Junr., Gladstone	313	113	
	314	123	
	315	129	
		365	
A. J. Monkhouse Woodside	316	137	
	317	155	
	318	52	
		244	
B. Cooke, Kanmantoo	319	169	
	320	165	
	321	150	
		484	
Gallagher & Aslin, Pooraka	464	115	
	465	144	
	466	131	
		390	

The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.

Competitor.	Bird No.	First Grade Eggs.	
W. C. Slape, Magill	467	95	
	468	118	
	469	dead	
		213	
Willow Bend Stud Poultry Farm, North Walkerville	474	161	
	475	7	
	476	138	306
	477	111	
	478	165	
	479	166	442
			748
Total Class 1. ...		32,244	

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934	
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	66	
	323	5	
	324	55	
		126	
G. Frisby Smith, Fulham (Minorcas)	325	—	
	326	103	
	327	124	
		227	
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	64	
	329	130	
	330	108	
		302	
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	79	
	332	148	
	333	110	
		337	
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	26	
	472	116	
	473	136	
		278	
Total Class No. 2		1,270	

Class No. 3.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs.	
H. J. Mills, 108, Edward Street Edwardstown	334	144	
	335	92	
	336	138	374
	337	123	
	338	152	
	339	190	465
			839
A. G. Dawes Portrush Road, Glenunga Gardens	340	165	
	341	87	
	342	140	392
	343	112	
	344	103	
	345	124	339
			731
Willow Bend Stud Poutry Farm, North Walkerville	346	157	
	347	141	
	348	112	410
	349	116	
	350	42	
	351	60	218
			628
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	109	
	353	107	
	354	128	344
	355	76	
	356	151	
	357	111	338
			682
A. C. Byrne, 114, Rose Terrace, Wayville West	358	125	
	359	126	
	360	88	339
	361	103	
	362	62	
	363	94	259
			598
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	105	
	366	119	
		262	
C. H. Lines, jun. Gladstone	367	126	
	368	75	
	369	7	
		208	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
	370	51	
J. H. Dowling,	371	98	
Glossop,	372	66	
River Murray			
		215	
F. F. Welford,	373	123	
Ludgate Circus,	374	132	
Colonel Light Gardens	375	136	
		391	
	376	151	
Mrs. M. Specht,	377	128	
Holder Avenue,	378	127	
Richmond			
		406	
	379	89	
	380	128	
W. Rentoul Christie,	381	55	
Claremont Avenue,			
Mitcham		272	
	382	138	
G. Frisby Smith,	383	33	
Fulham House,	384	85	
Fulham			
		256	
	385	160	
B. Cooke,	386	135	
Kanmantoo	387	140	
		435	
	480	164	
Willow Bend Stud	481	129	
Poultry Farm,	482	150	443
North Walkerville	483	89	
	484	134	
	485	134	357
			800
	458	178	
F. F. Welford,	459	146	
Ludgate Circus,	460	175	499
Colonel Light Gardens			
		890	

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Total Class No. 3.		7,222

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
	388	109	
A. G. Dawes,	389	130	
Portrush Road,	390	70	309
Glenunga Gardens	391	132	
(Rhode Island Reds.)	392	119	
	393	130	381
			690
	394	113	
A. G. Dawes,	395	150	
Portrush Road,	396	161	424
Glenunga Gardens	397	141	
(Rhode Island Reds.)	398	55	
	399	130	326
			750
E. F. Snow,	400	65	
18, Mt. Barker Road,	401	98	
Glen Osmond	402	154	
(Rhode Island Reds.)			
		317	
W. R. Williams,	403	86	
Avenue Road,	404	102	
Frewville	405	135	
(Rhode Island Reds.)			
		323	
Woodbury Poultry Farm,	406	61	
Stirling East	407	151	
(Rhode Island Reds.)	408	136	
		348	
V. F. Gameau,	409	108	
Findon Road	410	90	
Woodville	411	93	
(Rhode Island Reds.)			
		291	
K. Pennack,	412	139	
Pooraka	413	112	
(Barnevelders.)	414	147	
		398	
	461	38	
G. W. Lindsay,	462	64	
Torrens Road	463	127	
Kilkenny			
(Langshans.)		229	
Total Class No. 4.		3,346	

Class No. 5—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
	415	120	
	416	117	
	417	66	303
A. O. Dawkins,	418	129	
Gawler	419	153	
	420	143	425
			728
A. V. Dupen,	421	56	
Melton Street,	422	dead	
Glenelg	423	153	
		209	
	424	154	
A. J. Monkhouse,	425	132	
Woodside	426	136	
		422	
Total Class No. 5.		1,359	

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.	
	427	81	
	428	89	
A. C. Byrne,	429	100	270
114, Rose Terrace,	430	92	
Wayville West	431	122	
	432	130	344
			614
G. Frisby Smith,	433	143	
Fulham House,	434	98	
Fulham	435	120	
		361	
Total Class No. 7.		975	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 1st, 1934.
Home Project Utility Section.—Wet Mash.		
John Plummer, Virginia School	436	122
Dudley Harper, Murray Bridge School	437	89
Jack Beauchamp, Murray Bridge School	438	85
Jack Beauchamp, Murray Bridge School	439	94
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	160
Stanley Pratt, Abattoirs School	442	142
Mervyn Steer, Sturt School	443	127
Donald Welford, Westbourne Park School	444	121
E. Zbierski, Gawler School	445	dead
J. McInerney, Gawler School	446	82
F. Martin, Gawler School	447	150
Darcy Coleman, Mallala School	448	116
Kevin Angus, Mallala School	449	63
Alwin Scott, Wellington Road School	450	119
Jack Dietman, Wellington Road School	451	122
Milton Smith, Salisbury School	452	153
Owen Robinson, Ascot Park School	453	100
Paul Mundy, Urrbrae High School	454	102
Max Couche, Thebarton School	455	153
Robert Swift, Murray Bridge School	456	165
Bruce Dooland, Thebarton Central School	457	23
Ian Slee, Two Wells School	470	106
Total		2,394

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED DECEMBER 1ST, 1934.—
FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	184	39
B. R. Whittington	174	141
B. Cooke	169	319
A. V. Dupen	169	281
Trios—		
B. Cooke	484	319–321
A. & H. Gurr	446	196-198
Willow Bend Stud Poultry Farm	442	477-479
Teams—		
A. & H. Gurr	820	193–198
Gallagher & Aslin	788	307–309 and 464–466
A. G. Dawes	748	205-210
Willow Bend Stud Poultry Farm	748	474-479

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	148	332
Langmaid & Bettison (Minorca)	136	473
V. F. Gameau (Minorca)	130	329
Trios—		
A. Heaysman (Cuckoo Leghorns)	337	331–333
V. F. Gameau (Minorcas)	302	328–330
Langmaid & Bettison (Minorcas)	278	471–473

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	190	339
F. F. Welford	178	458
F. F. Welford	175	460
Trios—		
F. F. Welford	499	458–460
H. J. Mills	465	337–339
Willow Bend Stud Poultry Farm	443	480–482
Teams—		
F. F. Welford	890	373–375 and 458–460
H. J. Mills	839	334–339
Willow Bend Stud Poultry Farm	800	480–485

Class 4.—Any other Heavy Breeds.

All Rhode Island Reds.

Singles—		
A. G. Dawes	161	396
E. F. Snow	154	402
Woodbury Poultry Farm	151	407
Trios—		
A. G. Dawes	424	394–396
K. Pennack (Barnevelders)	398	412–414
A. G. Dawes	381	391–393
Teams—		
A. G. Dawes	750	394–399
A. G. Dawes	690	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—		
A. J. Monkhouse	154	424
A. V. Dupen	153	423
A. O. Dawkins	153	419
Trios—		
A. O. Dawkins	425	418-420
A. J. Monkhouse	422	424–426
Teams—		
A. O. Dawkins	728	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	143	433
A. C. Byrne	130	432
A. C. Byrne	122	431
Trios—		
G. Frisby Smith	361	433–435
A. C. Byrne	344	430–432
Teams—		
A. C. Byrne	614	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Robert Swift, Murray Bridge (Black Orpington)	165	456
Eric Pratt, Abattoirs (White Leghorn)	160	441
Milton Smith, Salisbury (White Leghorn)	153	452
Max Couche, Thebarton (Rhode Island Red)	153	455
F. Martin, Gawler (White Leghorn)	150	447

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

***No.* 5 *Test.*—Morning—1½ozs. wheat per bird.**
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to October 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to Oct. 31st, 1934.	No. Eggs Laid Month of Nov., 1934.	Total Eggs Laid April 1st, 1933, to Nov. 30th, 1934.
No. 1 test	11,403	698	12,101
No. 2 test	10,543	765	11,308
No. 3 test	10,325	635	10,960
No. 4 test	11,556	641	12,197
No. 5 test	5,948	348	6,296

PAPERS READ AT CONFERENCES.

SOUTHERN CONFERENCE, STRATHALBYN, AUGUST 16th.

SOME REMARKS ON THE CHARACTERISTICS, CLASSIFICATION, AND MARKETING OF WOOL.

[B. S. Proctor, Mount Compass.]

From the time when wool was regularly exported from Australia it has proved to be the greatest wealth-producing industry. The drop in prices during the past three or four years has been largely responsible for the depression through which Australia is now passing. In the year 1927-28, when prices were high and wool production was almost a record, the total of £61,000,000 was received, while a contrast is provided during the 1931-32 season when the wool cheque was down to £35,073,500.

The cause of the decline in wool values was largely brought about by the manufacture of artificial wool and silk, the extensive production of these substitutes being made easy by the high prices which had been ruling for some years for genuine wool. The substitutes for wool looked attractive when made up, and were placed on the market at a very low price. However, when wool descended to a price somewhere near their own cost, these substitutes could not compete successfully against it, and when the huge stocks of wool which manufacturers had accumulated on the other side of the world gradually became exhausted the industry experienced a welcome change for the better. The promising outlook of a few months ago has latterly received a check which we all hope is momentary. The fall in prices can be attributed to political rather than to economic reasons—Germany, Italy, and Japan having greatly lessened their support owing to embargoes and restrictions on wool imports.

Characteristics of Wool.

Wool is a product of Nature, and it requires only to be separated from the grease, vegetable matter, and mineral matter which it contains to make itself at once available for manufacture. Perhaps wool's outstanding characteristic is its ability to absorb moisture and yet continue to give warmth. The possibility of contracting a chill is lessened materially when, after exertion on a hot day a sudden change of temperature occurs, for a woollen undergarment takes up the moisture and imparts a glow to the body.

Another characteristic hardly less important—especially in the manufacturing trade—is the presence of numerous saw-like edges or serrations, which are revealed throughout the length of a wool fibre when placed under a microscope. This characteristic gives wool the felting properties which no substitute textile possesses. The saw-like edges of one fibre mesh in with those of another producing a closely felted or matted appearance when manufacturing is complete. This remarkable feature which Nature has given to wool is demonstrated as soon as a fleece is shorn from the sheep's back, for a well grown, healthy fleece will hold together when roughly picked up from the board and vigorously thrown out on to the wool table. A fibre of Merino wool possesses about 1,000 to 1,200 serrations throughout each inch of its length, while a fibre of Lincoln wool shows about 500 serrations per inch. Thus it will be seen why the coarser crossbred and English-bred wools are more lustrous—they have a less broken surface from which to reflect the light. Yet another advantage which wool holds over its rivals is its ability to absorb and retain dye. Each separate fibre of wool on the sheep's back grows from the follicle situated just underneath the skin, and running from the follicle to the tip of the fibre is the hollow tube or medulla which conducts the nourishment necessary for the fibre's growth. When the

fibre is shorn from the skin the hollow tube remains open, and when the wool ultimately arrives at the dyeing process the liquid enters at the cut end. The wool fibre being of a porous and transparent nature, the dye permeates through it completely.

The elasticity of garments made from wool is an advantage distinct from any other textile; it possesses a natural curl or crimp which adds to its attractiveness and touch, and also it is much less inflammable than any of its rivals.

Wool Counts.

There are many growers of wool who do not know what the different terms such as 56's, 60's, 64's mean. These figures refer to the quality or "counts" of wool, namely, the fineness or coarseness of the wool fibre. After sorting and blending, which is followed by scouring and drying, the wool goes through the process of carding, whereby the fibres are laid parallel after their great disarrangement in the action of scouring and drying The wool comes off the carding machine in the form of a filmy mat 3ft. to 4ft. wide, and then proceeds to the combing machine, where the long and short fibres are separated. The long fibres go to form what are known as "tops," and the short fibres are termed "noils."

The tops proceed to the spinning machines to be converted into yarn, and the the terms 56's, 60's, 64's refer to the number of hanks of yarn or wool which can be spun from 1lb. of top or combed wool. A hank of wool is about 560yds. in length, so that 1lb. of 64's wool—after it has been scoured and combed, will spin 64 hanks each 560yds. in length; a 56's wool would spin 56 hanks, and so on, provided, of course, that the raw wool in the first instance is of sufficient length of staple to be termed a combing wool, *i.e.,* 2in. or more.

To differentiate in the matter of the various recognised qualities of wool is a knowledge soon obtainable by experience, and by becoming accustomed to take in the size of the wool fibre both on the wool table and on the sheep's back.

It will follow then that the greater the numeral the finer is the wool. Quality in wool is governed to a large extent by the length of the staple. Very fine quality Merino wools are short, while they lengthen as the quality becomes "stronger" or "broader," until when the crossbred wools and English-bred wools are seen their length increases up to 5in. or more.

The recognised qualities in the wool trade are as follows:—

Counts	Quality	Counts	Quality
100, 90, 80, 74, 70	Fine Merinos	58, 56	Comebacks and Fine Crossbreds
64	Medium	50, 46	Medium Crossbreds
60	Strong	44, 40, 36, 32	Coarse Crossbreds and Lincoln

In discussing wool production in Australia the saltbush or outside country produces the bulk of it. This wool is mainly of 60's, 64's, and 70's quality—all Merino wool, of course—and of such excellent type as to be responsible for Australia's reputation as a wool-producing country. It must not be forgotten, however, that this outside country could not maintain its high standard for wool production were it not able to draw periodically upon the resources of the great Merino studs which mainly exist in the inside or more settled areas. It is doubtful if we fully realise what Australia as a whole owes to the Merino stud breeders who have, by devoting their lifelong experience, utmost care, and considerable enterprise, as well as sparing no expense, succeeded in breeding

rams of a standard of excellence unsurpassed anywhere in the world. The introduction of these rams into the outside flocks is necessary to impart size to the frame, type to the body, and character to the wool of the progeny.

Wool grown in the inside country of this State—the Lower North, Hills, and Southern Districts—is of a coarser nature generally; climatic conditions having this influence upon it, and the presence of English breeds of sheep is responsible for comeback and crossbred wool. From the South-Eastern districts come the finest quality and lightest conditioned wools which look so attractive on the show floors, but natural conditions in the South-East do not lend themselves to produce the large-framed sheep of the northern areas with its robust stapled, heavy cutting fleece.

At this stage it would be well to note the effect made upon the growth of the wool fibre by a lean period in its year's growth. The sheep may be shifted on to poorer country, or after a prolonged dry spell which is now being experienced, heavy rains may fall resulting in a flush of feed causing the wool to start growing quickly. In either of the above cases a break or tender spot in the fleece occurs, which is adverse to the selling value of the wool in that it cannot go through the process of combing, as it would break under the strain. It is therefore termed a "clothing" wool, and undergoes a different process from the sound wool of combing length, *i.e.*, 2in. or over. Instances of tender wool may occur in any clip, and the grower should be most careful to see that it is kept separate from his sound wool. The State generally can expect a great deal of tender wool in this year's clip.

On the Wool Floors.

On arrival at a Port Adelaide wool store each bale is weighed, the original copy of the weight slip going to the firm's wool department in Adelaide, whilst one copy is retained at the store, and the other forwarded to the grower. Each bale is stacked with the remainder of the clip in the bulk part of the store. The stores are of two and three stories, some having an underground cellar as well. One store can accommodate up to 60,000 bales, so that the method and order has to be maintained to handle this huge quantity of wool, for throughout the wool season bales are being shipped away after each sale, while new wool is constantly arriving during about nine months of the year.

The bulk floors are laid out in the form of streets or alleyways, the bales stacked four or five high, each separate clip kept together, and each bale with its brand, description, and number visible. The location of each clip as it is stacked is recorded in an index, so that the whereabouts of any clip is easily ascertainable. All is hustle and bustle on the bulk floors at the height of the wool season, for perhaps there are four or five different wool scales weighing in wool at various points along the sides of the stores from railway trucks or motor lorries, while at the same time wool is being loaded on to trollies, to be shipped away after a sale has taken place. Men with hand trucks, on which the bales are conveyed about the stores, are moving in all directions to or from the various gangs of men who are constantly stacking the incoming wool, pulling down the stacks which are to be shipped, or sending up sample bales to the show floor, two or three stories above, for the next sale.

The area of the bulk floors and cellars of one Port Adelaide store is 15 acres, while the show floors cover 4½ acres.

All wool is sold in the order in which it arrives at the store. Prior to a sale the rough catalogue sheets are sent down from the Adelaide office, and a sample marker goes through the bulk floors and marks with chalk those bales in each different description of the various clips, which are reckoned to give a fair average indication to the buyers of each kind of wool they represent.

For classed Merino clips 3 bales are shown where the description is of from 4-9 bales, 4 bales when the number is from 10-14, 5 bales when these are 15-24, and so on up to 50 bales of one description, when about 10 bales are shown.

The sample bales are sent up to the show floor on electric elevators. The roof of the show floor is largely composed of glass to provide a good light, and the floor is planned out in streets, with the main one running the full length of the floor, and the others running at right angles to it. Each clip, as it arrives on the floor, is placed in order, running from the fleece lines down to the locks. When each bale is cut open and some wool pulled from it, an expert of the firm examines it to see that each bale is true to type and description, while he also "lots" it, giving each different description a number. From these rough sheets the catalogue is made up, and the sale is ready for inspection by the buyers, who are provided with catalogues, and proceed to make their valuations and record them alongside each lot number.

The wool buyers are sent out each season by the manufacturing firms of England, France, Belgium, Germany, America, Japan, &c., and are constantly travelling between the various capitals, as the sales are held. Brisbane and Sydney are usually worked by one section, while Melbourne, Geelong, Adelaide and Perth are worked by another.

Different sections of buyers operate on various classes and grades of wool. America, owing to a high import duty on wool, buys mostly top-grade wools, which are bulky and light, as the duty is based on weight. France buys much burry wool, as her manufacturers are able to deal with this class of wool more economically than some other countries. Germany is also a contender for top-grade wools, as is Japan, and this country was responsible some little time ago for the market for Comeback and Crossbred wools improving in price as much as 2d. and 3d. per lb.

Each buyer is kept in touch by cable with his firm of the latest trend of the wool market, London being regarded as the world's standard. He is given his "limits" from time to time, which are the highest prices to which he can bid for certain classes of wool. Arriving at a type of wool suitable to his requirements, he ascertains the "yield," the amount of cleaned scoured wool which will remain after the earth, grease, &c., has been removed. Ability to arrive at a correct estimate is, of course, a matter of experience. While arriving at a decision the buyer will test a staple here and there for soundness, for a "tender" wool is not always discernible to the eye at first glance.

Another feature to be reckoned with by the buyer of any particular wool is the "tear" or the amount of long fibres which will ultimately be combable, as compared with the short fibres, which are too short for this process. These long fibres ultimately become "tops," while the shorter fibres become "noils." The "second cuts" made during shearing are an example of "noils."

A good Merino wool will tear about 8-1, *i.e.,* there will be ultimately, after scouring and combing are done, 8lbs. of top and 1lb. of noil in each 9lbs. of wool. In manufacturing, the tops are spun into worsted or suiting cloth, etc., while the noils are woven into blankets and rugs; consequently noils are of less value than tops.

While the buyers are arriving at their values, wool experts of each firm value the wool of every separate lot on the show floor on the latest market quotations, in order to safeguard the interests of the growers whose wool they are offering.

The Wool Sales.

At the wool sale which is conducted at the Wool Exchange in Adelaide, the auctioneer has the valuations made by these experts inserted alongside each lot number in his catalogue, and if the buyers do not bid up to this valuation the lot

is passed over for the time being, and perhaps sold privately to the highest bidder after the sale, when he may pay the price asked, or, if the auctioneer deems it advisable, the lot in question may be offered at a later sale in the season. Growers sometimes take it upon themselves to put a reserve price on some of their wool. This practice is not looked upon favourably by the wool selling firms, for very few growers are in a position to form an accurate estimation of any lot of wool, and are certainly not in touch with the activities of the market whereby the correct estimation is arrived at. Many growers were reminded of this fact a few years ago, when the price of wool commenced to slump, for as some of them held to their reserve price, the market dropped lower and lower, and all hope of obtaining their original reserve, or even the price which was bid for it at auction, had vanished. The wise course to adopt is to leave the matter of disposing of the wool clip entirely to the brokers' experts, who are men with a life-long experience in the wool trade, and who possess a first-hand knowledge of the world's market.

At the wool sale the auctioneer is accompanied on the rostrum by the wool experts, and the buyers—there may be 50 of them—sit in a semi-circle before him. Bidding starts immediately each lot number is called, perhaps up to a dozen buyers shouting their bids in farthings or more at a time, some jumping to their feet or shooting out an arm in order to attract his attention, for in many cases it is the buyer who can get his bid in first who obtains the lot. The final bid is announced, along with the buyer's name, and the next lot is straightaway offered.

An auctioneer usually sells from 370 to 450 lots per hour, and is kept at high tension to note the bids from the keen buyers of all nationalities.

When the sale is over the sample bales on the show floor are sewn up and dropped below to their own clips, where the bales to be shipped are branded with the buyer's shipping mark. Before leaving the store these bales are "dumped" by hydraulic presses into half their original size, and are held by three steel bands. Most of the bales destined for export—say, from a sale of 20,000 bales—have been shipped from Port Adelaide within a week of their being sold, much of this work being done at night.

Immediately the show floor bales are dropped below, or even while the operation is in progress, new sample bales are coming up the elevators for the following sale.

Wool-selling Systems.

Star Lots.

There have been some important systems of wool selling introduced in recent years. The sample bales appearing on the show floor stand in three distinct sections. First of all are the "big lots" as they are called, *i.e.*, any lot of one brand and description containing four bales or over. These big lots are sold on sale day in the main auction room, and are bid for by a different section of buyers who purchase the "star" lots in a separate room. The star lots are of from one to three bales. The reason is obvious—the great length of time that would be taken up by selling all these star lots is minimised by having them sold at the same time as the big lots.

When the star bales come on to the show floor they are lined up along various streets according to their descriptions—fleece, pieces, bellies, and so on—no notice being taken for the time of their different ownership. Up to a certain point, however, wool from any one district is kept together.

An expert on the floor examines these star bales, and lots as many as possible together which are similar in quality and condition, and every lot of seven or more which he can arrange is classed as a "big" lot. These bales occupy one

particular portion of the floor, and are sold in the main auction room as "big" lots. They may be owned by three or four different growers, each of whom receives the same price, and is ensured of better competition than if his one or two bales had been offered in the "star" section of the floor. This system, known as "interlotting," is advantageous to grower, seller, and buyer.

The bales which cannot be matched to others to form an "interlot" are classed as "stars," and occupy a separate portion of the floor. Another important section of the catalogue is the "bag" section. Many growers have a few odd fleeces—perhaps a black fleece, two or three rams' fleeces, or some oddments —which will not go into a bale. These are mostly sent to the store in bags.

On arrival they are weighed and sent to one particular portion of the store where they are check-weighed, and the contents classed by an experienced classer into various bins according to their description, quality, and condition, &c. The wool from one bag may be classed into two or more bins, each quantity of wool being weighed and the weight entered on the weight slip. Just before each sale eventuates the wool in all the bins is baled up and sent to the show floor where it is offered just as if it constituted one big wool clip. There may be as many as 30-40 bales in any one line of fleece, lambs, or pieces, &c., and buyers are always keen to purchase a large line of wool, consequently these bales bring very good prices, and if a grower has only 10lbs. of wool in any of these lots he receives a price at the same rate as though he was offering many bales of it. This system of dealing with the bag wool is a great factor in providing the grower with a good price for his oddments.

Classification of Wool.

It is on a wool show floor that the great necessity for the systematic classification of wool is noted. All the large clips, of course, are correctly classed, and it is the owner of the flock of 500, or in some cases more sheep, who is usually at fault. Some growers roll up the fleece anyhow, with the belly and stained pieces attached, and send it thus to the wool store. If they only knew the amount of money they lost by so doing they would be astounded. Especially was this the case about 1924-27, when wool was commanding a big price. It seemed that it was selling too well for these growers, whose one idea appeared to be to get rid of the wool from the farm. Many, no doubt, would be extremely glad in these times of the money thus wasted. Of course, the brokers notice any variation in quality in the fleece lots such as Crossbred and Merino fleece being in the same bale, and they undertake to reclass clips of this nature at a charge, of course, but it seems better for the grower to have this money in his own pocket, which he can do by using a little restraint and common sense.

The bales which contain bellies, pieces, stained pieces, and locks, as well as the fleece wool, are, of course, well provided for by the buyer in estimating his value.

Woolclassing is the preparation of a clip for market in as few and as large lines as possible by keeping wool of the same monetary value and quality as far as practicable together. The reason for this is to enable a buyer to purchase a line of wool of even quality and condition suitable for his requirements.

Five points to have in mind are:—

1. Quality or fineness
2. Soundness, or strength of staple.
3. Colour.
4. Length of staple.
5. Condition, or amount of grease, vegetable matter, and earth.

Merino wools are classed chiefly on condition; Crossbred and Comeback wools on quality.

[Papers Read at Conferences.]

THE FARMER'S CLIP.

In outlining the best procedure for a farmer to adopt in getting up his clip for market, he should make as much room available as possible for the convenient handling of his wool. The less the fleeces are handled after being classed the better, and keeping them from coming into contact with earth, chaff, &c., will add to their appearance on the show floor. Partitions should be erected between which the fleeces can be stacked before baling, thereby also providing a guide for the distinction to be maintained between the various differences which may occur in the wool as it is shorn. If the baling can be done behind these partitions so much the better. A correctly made wool table is necessary for best results—battens 1in. to 1½in. wide and about 1in. apart.

When a fleece has been correctly thrown on to the table, the neck is at one end and the britch at the other. This can be accomplished easily by the picker-up if he gathers the fleece carefully from the board; first of all taking hold of either side of the britch end of the fleece and by using his feet and hands in conjunction to gather up and hold the fleece gently but firmly between his arms. Retaining hold of the britch, when the fleece is thrown, of course, ensures an even spread over the table.

SKIRTING AND ROLLING THE FLEECE.

The amount of skirting to be removed is determined by the quantity of burr and seed on the side of the fleece. In these districts, however, our wools can be termed "free" wools, so the skirting ought not to be heavy.

Starting at the neck the skirter removes any short-stapled wool on the edges of the fleece, any light, burry, or seedy portions, the "top-not," and the black-earthy, sweat-stained portions from around the legs. Fleeces must be carefully backed when necessary to remove tender heavy-conditioned wool. All this wool shows up readily, if left on the fleece, when the wool is opened for inspection, and detracts from its appearance.

In rolling the fleece, draw the britch end up to the middle of the fleece, lapping it over, throw in the neck slightly, the sides are thrown over to meet in the middle of the fleece, and it is then rolled up towards the neck end, displaying the shoulder wool, and it is then ready for classing.

On no account tie any fleeces with string or binder twine as is sometimes done for some reason.

After fleeces have been classed for some time the pieces on the floor can be picked up and sorted. If they are good, bulky pieces, remove the short, earthy edges, leaving the main portion looking more attractive and containing wool of good length staple. Class these as AA and A Pieces.

Bellies of good length staple can be treated similarly, taking care to remove pizzle stains from the wethers' bellies, which go in with the stained pieces.

The locks which accumulated about the floor and under the table can be baled up at intervals.

Lambs' wool can be classed over the wool table with advantage by covering it with hessian, two boards being effective in gathering this wool up from the shearing board.

If lambs' wool is of fair length, pick out the longest and brightest of it, marking AA lbs., while the short, heavier conditioned wool will be termed A lbs.

In suggesting possible lines for classing a farmer's clip of, say, 500 Merino sheep, the following may be of assistance:—

AA Mo.—All the brightest, lightest conditioned and longest stapled fleeces of fine quality and sound.

A Mo.—Duller and heavier conditioned than above, and shorter in staple.

Mo.—Very heavy conditioned, fatty and tender fleeces; to take a few out-types.

The farmer with a mixed flock—both Merino and Crossbred sheep—would do well to deal with his Merinos first, and bale all the wool shorn from them before commencing shearing and classing his Crossbreds. Crossbred wool is classed largely on quality. Lines for such a flock may be:—

A CBK.—Fleeces of 58's quality and finer, bright and sound.

A XB.—Fleeces bright and light and sound of 50's to 56's quality.

B XB.—Fleeces of 50's and under, bright and light.

XB.—Fleeces of 50's and under, bright and light.

As few lines as possible should be made in the clip.

In classing wool, there are usually some fleeces which do not really suit any line of the four or five which are made. They can be easily kept aside, and will probably be sufficient to form a bale with some of the oddments, such as pieces or locks. It is better to keep these fleeces apart than to force them into a line to get rid of them, and thus drag down the appearance of that line. It is better—if in doubt about whether a fleece should go into one line or another—to put into the lower class. It will tend to improve that line, but will have an opposite effect on the higher line.

The farmer should endeavour to get up his clip to the best advantage. It is more satisfaction to him, and certainly appeals more to the firms who are handling it than the untidy, slovenly bales seen sometimes in a store.

A well-pressed bale has a very neat appearance. The farmer's brand, preferably one name, should be clearly and neatly put on, both on the top and side of the bale. Underneath the brand should appear the description, and under that the number of the bale.

In consigning his wool to any firm for sale, the farmer should advise the firm of the number of bales he is consigning, the descriptions and numbers of each bale, being careful to point out any bales that perhaps contain wool of more than one description. This procedure is appreciated by the wool firms, and aids considerably in the handling of the clip while in store.

It is largely through the medium of this great industry that Australia is going to make a recovery from the financial depression through which she is now passing. It is an industry in which many millions of pounds have been invested, and when we hear of fresh substitutes for wool being experimented with in various parts of the world, and some of our chief purchasers threatening to endeavour to carry on without acquiring wool from us, we Australians ought to consider just how much we can help the industry by our own efforts. The time-worn axiom that "charity begins at home" seems to suggest itself, and we can put it into practice, with advantage to the country's income, by purchasing all our requirements, wherever the opportunity lends itself, with articles made from wool.

MURRAY LANDS EAST BRANCHES AT CALIPH ON September 20th.

FAT LAMB RAISING.

[M. J. SHANNON, Pata.]

The subject of fat lamb breeding is a far bigger one than most farmers appreciate. Instead of making it the haphazard business which is so frequently done, the farmer should give it as much attention as he does his wheat farming, and considering the profit in comparison to expenses and labour, a little consideration for his sheep, and attention during certain periods of the year, his work and outlay show a profit far beyond his most optimistic expectations.

Generally too little consideration is given to sheep on farms, and they are all too often looked upon merely as a means of keeping the farm clean for wheat farming. It is a common sight to see sheep almost starving on a fallow paddock. The owner is forcing them to do the work that he should do himself, and if he cares to take the trouble of testing the difference between sheep that have been considered and sheep that have been used as scavengers only he will find that the cost of cultivating or harrowing would have been returned to him many times over. Some time ago two local farmers bought identical rams from me. One farmer gave his sheep every consideration. He received up to 22s. 4d. for his lambs and averaged 12d. a pound for his wool. The other man made his sheep work his fallow for him. His highest price for lambs was 11s., and his wool average about 9d. The difference works out at about £46 per hundred sheep. This is without counting the higher percentage of lambs and greater yield of wool received by the first farmer. Most fallow paddocks require sheep on them at some period of the year, but use commonsense, and do not allow the sheep to suffer.

At present prices, a man with 100 ewes, giving them reasonable consideration and attention, should make approximately £100 a year clear profit. There are numbers of farmers throughout the district who are making even more. Of course, the greater number of sheep held the lower the profit per sheep, owing to the farmer's inability to give as close attention to, say, 1,000 breeding ewes as he could to, say, 200; but with a large flock he can afford to take a lower profit per head, because his aggregate return for the year is so very much larger, and he does not miss his losses as much as he would if he were understocked.

The Export Trade.

The fat lamb market is very uncertain. English livestock producers are impatient at the large amount of meat imported into England at present, and it appears as though restrictions will be placed on meat imported into the British Isles. If this happens only the best quality lamb, in all probability, will be exported from Australia.

England is the only available export market for lamb, and South Australia must send overseas only what its customers require. If their demand eases off local markets will re-act at once, to South Australia's great detriment, and it is possible that in the near future lower grade lambs will not be sent overseas. If producers of export lambs refuse to recognise this, and persist in breeding and trying to sell unsuitable lambs, they will be hit badly.

Farmers in the back country, having to contend with uncertain climatic conditions, will find it difficult to produce lambs of the desired shape and quality, because this district is not really suitable for producing certain Down types of lambs that present demands require, but it is possible, with care, to produce a grade of lamb very close to A1 quality. An enormous amount of propaganda or advertising has been done in England in respect to South Australian lambs by the Trade Commissioner (Mr. C. McCann), and also by Mr. G. A. Cooper, the latter having presented expensive trophies for lamb competitions. This has considerably assisted in creating a strong market in London for South Australian lambs, but these men can only go a certain distance, and if growers do not supply the desired quality of meat it will be useless to forward inferior lamb in the hope that it will go through. It may sell, of course, but will ultimately destroy the good name South Australian lambs are winning. These men are experts and know their business; they are at the seat of the market, and know the position and requirements better than any man in Australia.

The fat lamb market opens a very big field for expirement and profit to every farmer with sufficient land cleared and fenced to carry sheep.

[*Papers Read at Conferences.*]

About eight or nine years ago I realised the possibilities of the lamb market. I had up till then been a hundred per cent. Merino breeder, but found that over a period of years we only have approximately four months of green feed, which is insufficient to grow and fatten Merinos and get the lambs into the early markets that usually prove so profitable. My experience of English breeds was nil, having been associated solely with Merinos, but as an experiment I ordered some Dorset rams. Later I tried Suffolks and then Border Leicesters, and at present breed from Border Leicesters exclusively.

I soon found that it was possible to grow a lamb from the English breeds about four weeks quicker. That is, a lamb on good feed was ready for the Abattoirs four weeks sooner than a Merino, both being given equal conditions. It went even further. I found I could forward lambs for a longer period, because with Merinos, out of, say, 1,000 drop I would have anything up to 800 lambs left on my hands for shearing, whereas with crossbreds I would have about 200 only. This factor of a carry-over of lambs has a very definite bearing on the carrying capacity of a holding.

Border Leicester-Merino Lamb, 14½ weeks old, live weight, 110lbs. Ewe, aged 7 years.

I received a certain amount of chaffing regarding my intention of sending sucker lambs to the Abattoirs. Most people contended that the lambs would deteriorate too much during the journey, and that the experiment would be expensive; but a half truckload realised 28s. 3d. per head. That was the first load of fat sucker lambs ever sent from the Loxton district.

With our present knowledge, the doubts of years ago may seem to have been foolish, but there was no precedent to follow, and most of the sucker lambs that were being sold at the time were from sources very much nearer the market; and to take a 10 or 11-weeks-old lamb away from its mother and subject it to a long trying railway journey did—and for that matter still does—seem to be taking a risk of deterioration. If the lambs are left with the mothers until the last possible moment these lambs command a price, even after the long journey, that is very remunerative.

Actually the lambs travel exceptionally well, providing they have not been abused by over-loading and ill-treatment. No farmer need hesitate about sending lambs to the Abattoirs through fear of undue deterioration during the journey.

Many farmers make a great mistake by under-stocking. It is not uncommon to see farms carrying, say, 150 sheep when nearly double that number could be

reasonably carried. It is incorrect to have so many sheep that they are poverty-stricken all the year round, but there is a happy medium which will insure against loss of under or over-stocking.

Care of the Ewes.

Some breeders think it necessary to have their ewes mud fat for lambing, but there will be better results and less loss of ewes and lambs if the ewes are in just nice condition. This can be attributed to the fact that the lambs are not so fat when dropped, and consequently are easier for the ewes to eject. Over-fat ewes—especially young ewes—are subject to a temporary paralysis, and need constant and vigilant care and attention to save them when lambing. On the other hand, ewes in low condition—and especially when on poor or indifferent feed—will drop their lambs freely enough, but the lamb is usually very weak, and the ewes being also weak, and having to search for feed, stray off, and too often the lamb is lost and dies. Try and have the ewes in nice condition, and as soon as they lamb put them on the best feed available. Keep an untouched paddock of feed into which the lambs could be transferred as soon as possible after lambing. Do not have it too far away from the lambing paddock.

Ewes in lamb should be carefully handled. Avoid crushing them in a yard. If the yard will hold 200 sheep only put 150 in it for handling. Use the utmost care so that when they are released they do not wedge in the gateway. No effects from rough handling may be noticed at the time, but careful handling will save many lambs later.

Ewes lambing should not be unduly disturbed. Before they start to lamb ride through the paddocks frequently and get them accustomed to seeing you riding around amongst them. At first they will herd or bunch, but after a while they will take very little notice, especially if the ewes are three years old or more. You will then find when the ewes start lambing you will be able to attend them without causing any disturbance. In fact, if reasonable caution is practised they will almost ignore you.

When the ewes start lambing proper, coming in fair numbers each day, drive the flock very slowly, and without a dog, across the paddock. With a little practice and a wealth of patience practically every ewe with a lamb at foot can be drafted out. When these have been separated from the main flock gather the ewes and lambs together, and slowly take them to the better feed. This shifting of young lambs to the best feed has much to commend it, but probably only applies to a holding of 300 or more ewes. Ewes with lambs at foot are inclined to move slowly, and if mixed with dry sheep only get the second picking of the feed; the dry sheep race ahead. Ewes with twin lambs require extra care in handling, especially if one of the lambs is a bit weak, and it is better to move them by themselves. This all takes extra time and trouble, but pays in the long run. All young "hoggety" sheep and wethers should be drafted away from the ewes before the lambing starts.

Provision of Fodder.

The sowing of oats for green feed has by now proved itself to most flock-masters as a very necessary adjunct to successful lamb raising. No matter what kind of oat is sown, drill in a quantity of wheat and barley with the oats when sowing. This mixture will give half as much again to the fattening qualities of the green feed. A good dressing of superphosphate should always be given to the sowing of oats. I do not favour sowing pure barley or pure wheat for green feed. If it happens that these get away and run to head many of the sheep will founder. Oats will not cause this, and there is no risk from them at any time.

Types of Ram.

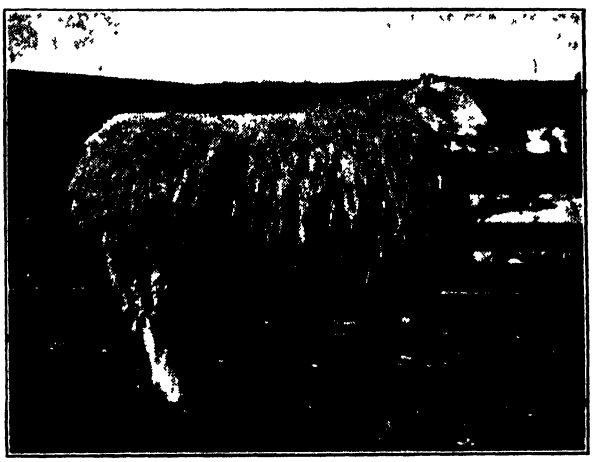
As a breeder of stud Border Leicesters, I feel I am on rather dangerous ground in commenting on any particular breed, but having tried at least three other

breeds which are fairly common throughout the district, I can only tell my experiences of the different types. If I appear to favour the Leicester remember that I have proved them to be very satisfactory.

The Dorset is a very fine sheep, strong, virile, and generally his progeny retains the Downs conformity so much talked of and admired; but his head is too big, and I have had up to 40 per cent. losses with maiden ewes during lambing, not counting many dead lambs that have had to be helped away from the ewes.

The Suffolk is an excellent ram for export lambs. The lambs have good shape and kill wonderfully well, showing a fine quantity of lean meat in comparison to fat. The lambs are quick growers, and command a good price even when the market is down, but they must be sold as lambs; if kept until full grown a large percentage will be of inferior quality. This applies more to ewes than wethers. Further, the ewes usually drop poor lambs in comparison to other British breeds.

The Shropshire ram is an excellent sheep, but is unsuitable for the outback country. He is an excellent lamb-getter, his lambs are strong, grow quickly, and are good doers; but the very woolly face makes it imperative that his lambs are



Border Leicester Ram, 13 months old, bred on the property of Mr. Shannon.

disposed of before the grass seeds are bad. This factor of having to dispose of lambs by the end of, say, September has a very big part to say in the choice of rams for fat lambs for sale. I have never used a Shropshire ram, but several breeders who have used them say that maiden ewes mated with this ram experience the same difficulty as ewes mated with the Dorset.

Many men like the Corriedale, and he is certainly a very good wool-getter, and although several have tried him in this district he has still to prove that he is suitable for the drier areas.

With the Border Leicester I have never had any trouble with lambing that could be traced to the ram. They have the smallest head of any ram. Their lambs are wonderful doers, and command a price at the sales equal to, if not better, than almost any other breed, and if they have to be kept on the farm they are exceptionally good mothers and grow to magnificent sheep. Their wool will quickly fill a bale, and often realises a price on a par with Merino. They are wonderful walkers, and can cover large areas in the search for food. If given a setback through lack of feed or some other cause they usually recuperate very quickly when conditions become normal. He has one fault, and that is he is inclined to be a shy worker, but once started makes up for lost time.

Then there are Lincolns, Polwarths, Romneys, Hampshires, Southdowns, and a host of others, each of which has its good points. In dealing with the British breeds the Merino ewe has been taken as the medium for lambs, and except for a good Comeback farmers will be well advised to stick to them.

THE MERINO.

This breed is too well-known to mention more than briefly, but the ram of this breed is definitely unsuitable for producing fat lambs for export, except in small numbers and on the very best of feed. One setback and the lamb will never properly recover from it. Every farmer has a few sheep amongst the flock that show effects of some trouble during their early life. The number may be small, because the lamb affected will in all probability not reach maturity.

So far as possible, only breed from ewes that are well sprung—ewes that have a large carrying capacity. If the ewes are small and narrow across the back there will be some risk in getting a good lambing percentage. A strong-wool ewe is always the best for utility purposes, and it pays to cull all ewes that are too fine in the wool, as they are usually the first to go when times are bad; also their lambs are not always so robust as they might be.

Always remember that it is necessary to keep the lambs improving in growth and appearance. Everything should be done to keep up the quality of the sheep. Many of the details of this paper are not of much value when seasons are exceptionally good, but if the season is average, or below, it is essential to have all the finer points right up to the mark.

LOOKING AFTER THE LAMBS.

Do not allow the lambs to get too big before tailing them. Three or four weeks I have found to be a very good age, provided that the lambs have been on good feed. I use searing irons for this purpose, and find it gives the lamb anything up to a fortnight's advance over the lamb knifed. It not only leaves the lamb with its normal amount of blood, but does away with the fear of deleterious germs. Handle the lambs carefully; they are very young, and can easily be injured for life. Do not overcrowd the yard, and try and pick the lamb up with both hands under its brisket. If you catch it by the leg keep your hand down low. If you hold the hind leg too high you are very liable to dislocate the hip joint. This also applies to grown sheep.

When castrating and tailing, sharp tools and cleanliness are absolutely essential.

When the lambs are ready for sale or export handle them very carefully. If the dogs are the least inclined to bite, muzzle them. Do not poke the sheep with sticks or anything pointed, and, most important of all, never, under any circumstances, grab a lamb or sheep by its wool. More lambs are rejected in the freezing works from effects of being grabbed by the wool than from all other causes. Farmers would be astounded if they saw the great bruises caused by the pulling of the wool. Buyers know the brands of the lambs they buy, and will only buy, so far as possible, brands which have proved to have the smallest number of rejects.

A lamb is ready for export when the live weight reaches about 85lbs. When trucking, do not overload the lorry to such an extent that when the siding is reached half the lambs are down and dirty. An inch or so of sand on the bottom of the lorry will go a long way in allowing the lambs to get a footing, and it will also absorb the liquid and droppings. Grating is the best, but few trucks have this.

Do not overload the railway truck. Each compartment holds comfortably 60 of the 85lb. lambs. If big sheep are mixed with lambs allow a little more looseness than with the same size sheep right through; also remember that under-loading is expensive. One has to pay just the same for 45 lambs as for a full 60 load. The expenses on a 60-lamb load—that is, a quarter van—run into approximately 1s. 9d. per head. This covers railage, untrucking, yard fees and commission, and the

difference in the price received at the Abattoirs to the local market is so great that last year dealers were operating at the local market and sending the lambs down to the Abattoirs and doing wonderfully well.

If there are not sufficient lambs ready to make a truckload, get in touch with your neighbours or the local agent and help fill a quarter rail van. Brand all the lambs, and the agency in Adelaide will attend to all other matters.

The argument may arise, "Does it pay to sell lambs as suckers in preference to holding them until full grown." My experience says, decidedly yes. Over all the years in which I have been sending away lambs only one year was unprofitable. It is customary to receive as much for a 10 or 12-weeks-old lamb at the Abattoirs in season as will be obtained for the same lamb 12 months later. In fact, if the lamb market is strong there will be a loss in value by holding. I saw several cases of that last year when neighbours, to make up a truckload, included some of their previous year's lambs, and received shillings a head less for them than the sucker

"The correct way to pick up a lamb." Both hands open under its brisket.

lambs. Not only that, but by selling the lambs off the mothers, and before the lambs have had time to pull the ewes down in condition, there will be a better wool clip, the ewes will do with less feed, and their longer period of dryness will ensure a better and quicker lambing next season.

By selling the lambs as suckers the flock can be increased. The lambs come during the flush period of the feed, when the carrying capacity of the farms is nearly doubled. If the full carrying capacity of the farm is, say, 500 sheep one can safely have that many ewes to lamb if the lambs are sold as suckers, whereas, if held until matured, it would not be possible to hold more than 300 ewes to lamb. This would mean a loss of at least 150 lambs, besides the extra wool from the 200 ewes, or, worked out on conservative values, about £160 a year loss. It would be far better to purchase cast for aged ewes, get two lambs from them, fatten and sell. By spreading the purchases over a year or two there would not be many to fatten and sell each year. Cast for aged ewes can usually be purchased at a reasonable price, and as they are the breeding ewes of stations that would have sold them long

before if they had not been good sheep, the inexperienced man can safely buy them and know he is not getting "a pig in a poke." No man is to be blamed for holding back some of his best ewe lambs, but do not overdo it.

If it is desired to raise lambs for quick profits it will be necessary to purchase British-breed rams. The type of ewe does not matter so much, but the big, plain-bodied, strong or medium-woolled ewe will give the better lamb, mother it better, and be easily the most profitable over a period of years.

Have the ewes properly crutched about six weeks before they are due to lamb. A big blow with the blades or two blows with the machines above the udder as well as the crutch will assist the baby lamb to find the teats readily, and perhaps avoid having ewes with inflated udders and teats through the lambs not finding its milk soon enough. It also keeps down flies.

Gestation with a ewe is 150 days, or approximately 5 months. Have the lambs come as soon as practicable, but remember that a lamb dropped on green feed will usually do twice as well as the lamb dropped on dry feed. Feeding ewes on concentrated foods before lambing has proved an excellent practice. This, of course, is really only necessary when the feed is dry or poor.

If only Merino rams are used there will be a large carry over unless the feed keeps wonderfully good and all the lambs dropped within three weeks or so. If lambing is strung out it will be very difficult to place lambs before the grass seeds come. Once the seeds come the Merinos will have to be shorn, and the demand for shorn lambs has been far below the value of the wool taken off them. Crossbreds, on the other hand, are not nearly so susceptible to seeds, and can be marketed for quite a long time after Merinos are out. Exporters do not want seed-pricked lambs, and the butchers are the only buyers of this class. Naturally this limits the market, so, if possible, get the lambs away before the seeds come.

Keep the bloom on the lambs if good prices are desired. By bloom is meant that fresh, clean appearance. A dirty, dusty, dry-looking lamb, even though it may be better under the skin, cannot compare with the lamb with the bloom still on it. Do not walk the lambs over miles of dry, dirty roads to market; it is easier and far better to lorry them, and it pays.

General Management.

Use plenty of rams. Two per cent. is low enough; 3 per cent. is better. The lambs are dropped quickly, and make a much more even line. If only a few rams are used—that is, too few for the number of ewes—a ram will waste his energy on one ewe, whereas if there is competition he will serve her and move on to where there is more excitement, and in the meantime find other ewes.

Go to some trouble, and make the farm unhealthy for foxes before lambing commences. If left until lambs are dropping, that is leaving it too late. Once the foxes start on the lambs they are hard to destroy. When a burrow is found get a gallon of carbon bi-sulphide and gas them. Carbon bi-sulphide can be purchased from any stock agent, and is an excellent means of dealing with them. Poison baits are also good.

Many of these comments may appear to the average, indifferent lamb breeder to be unnecessary, and making too much trouble and work, but the time is past when the man on the land can continue slip-shod methods, and the present economic stringency calls for brains, commonsense and ability to keep the wolves off the farm. The production of fat lambs will prove a very remunerative income, coming in during a period of the year when it is extremely useful, and the aim should be to do everything to produce those lambs as early as possible, in the best manner possible, and in the greatest numbers possible.

The greatest factor in producing quality lambs is good feed, and plenty of it. It is the key to the whole business, and without it your efforts will be in vain. Grow the feed, and success is assured.

[*Papers Read at Conferences.*]

BULK HANDLING OF WHEAT IN SOUTH AUSTRALIA.

[A. T. PENGILLY, Alawoona.]

The question of bulk handling is by no means new, as the first move was made about 26 years ago, and in a report of that date it was estimated that it would effect a saving of £60,000 to £100,000 on a 20,000,000 bushel harvest, and up to £150,000 on a 30,000,000 bushel harvest; but the report further states that Commissioners, whilst feeling that the case for bulk handling was strong, did not recommend its installation forthwith owing to the unfriendly attitude of shippers and others.

They recommended, however, that experiments should be carried out by the Government and private exporters to familiarise those interested with the advantages of the system, but no action was taken by the Government until 1914, when the Vaughan Government commissioned a Canadian firm to furnish it with a full report in reference to the construction, maintenance and operations of grain elevators, handling and shipping of grain in bulk, and this was placed before Parliament on December 17th, 1915.

In March, 1916, this firm was commissioned to prepare plans and specifiations and to supervise the construction of works as set out in the report, and in August of that year a motion was submitted to the House of Assembly seeking Parliamentary sanction to proceed with the works specified, at an estimated cost of £1,100,000; but, after a lengthy debate, the motion lapsed, and nothing was done.

The next move was made in 1922, when a local company of farmers made an unsuccessful effort to establish bulk handling in South Australia. The Commonwealth Government approved of the scheme, and passed an Act to facilitate its working; but, after various alterations and amendments, the Bill introduced in the State Parliament for the ratification of the agreement was rejected on the third reading, and consequently the company did not proceed with its scheme. No further official move seems to have taken place to establish bulk handling in this State until the question was referred to the Public Works Standing Committee on October 29th, 1931, and its first progress report, which has recently been printed, is of great interest, as it gives a wealth of information on the subject collected from various parts of the Commonwealth and other countries.

SCHEMES.

Several schemes have been inaugurated. The one in New South Wales has been operating for about 10 years, and the system employed at the Sydney terminal is that the majority of cargoes are loaded by elevators or pumped into the vessel, which means that a continuous stream of wheat is poured into the holds, and an ordinary vessel can be loaded in 24 hours, and from start to finish only two men are employed under each gantry or hatch. Throughout the New South Wales wheat belt silos are erected at various sidings, and the scheme is certainly working most efficiently, but not profitably, and unfortunately the cost of the same does not recommend itself as being suitable for installation in South Australia. The Canadian and American systems, although they appear to be satisfactory in their respective countries, do not seem to be an economic proposition for this country on account of the different conditions which exist in the three countries, for the capital cost would be far too heavy, and farmers would have to pay a charge out of all proportion to the value of his wheat in comparison with bag handling.

The only system in vogue which, with some improvements, appears to be suitable for this State is the "bin" system as used in Western Australia by the Westralian Farmers Limited. The difference between the "bin" and "silo" system is:—Silos are made of wood or concrete, are cylindrical in form, and are usually placed on a heavy foundation and carried to a considerable height above the ground. The bin, on the other hand, is simply a shed with reinforced sides and a floor laid down on ground level in the ordinary way. The Westralian Farmers Limited have installed several such bins, and the experiment is proving satisfactory, and appears to be both practical and economical. One farmer in Western Australia states that he has saved £103 by handling his crop of 12,400 bushels in bulk instead of bags, representing a saving of 2d. per bushel.

In 1932 the Public Works Standing Committee appointed a sub-committe, consisting of the Director of Agriculture (Professor A. J. Perkins), the Railways Commissioner (Mr. C. B. Anderson), and the Chairman of the Harbors Board (Mr. A. E. Farquhar) to further investigate the question of bulk handling, and the following are some of their recommendations:—1. The scheme must be entirely self-supporting. 2. The scheme shall operate over the whole of the broad gauge railway zone, with two terminals, one at Port Adelaide and one at Wallaroo. 3. That the minimum number of bushels delivered at a country siding to warrant the erection of elevator accommodation shall be 30,000 bushels.

The sub-committee further recommended that similar bins to those at present in use in Western Australia should be erected at country sidings, but at the terminal at Wallaroo it suggested the erection of a concrete turnover plant, and at Port Adelaide two alternative schemes were put forward, one consisting of an orthodox plant situated on a wharf site, and the other a concrete storage and turnover plant in Kingston railway yard, from which containers would be filled and emptied in the ship's hold by means of luffing cranes. The actual operation involved is that the

wheat after being weighed on a road weighbridge is emptied from the farmer's wagon or truck into the boot of a portable bucket elevator, from which it is delivered either direct into railway trucks or into the storage bin through an opening in the roof. The farmer unloads his own truck with the assistance of one man, who takes care of the elevator, and the wheat is similarly delivered from the sheds to the trucks, and so on. The estimated rate of loading into vessels is about 240 tons per hour at Wallaroo, and about 5,000 tons per 18-hour day at Port Adelaide.

The sub-committee was asked to devise a scheme that would be self-supporting, and in order to do this they considered it necessary that an initial charge of 3d. per bushel should be made for wheat passing through the terminal and 2½d. per bushel for bulk wheat consumed locally. The present cost of bag handling is estimated at 2½d. per bushel. The result of the scheme recommended by the sub-committee would be a net saving of £147,000 per annum to the wheat industry, which is based on all wheat being handled in bulk, and on the average harvest for the last nine years, made up as follows:—

Saving in bags at 9s. per dozen (assuming the farmer required 10 per cent. of the present bags per annum)	£174,487	
Saving in shipping freight, 270,000 tons at 2s. 6d. per ton	33,750	
		208,237
Less additional cost of bulk handling over bag handling, 15,500,000 bushels at ½d. per bushel	32,292	
Less value of bags paid for as wheat	29,062	
		61,354
Total saving per annum		£146,883
		(or 2.274d. per bushel)

An even greater saving could be expected, for at the moment there is in existence a plant for conveying wheat by suction from one container to another, and finally into the ship's hold, and which it is claimed is far more efficient and economical than the elevator system, and the danger of cracking the grain is said to be entirely eliminated. This being so, one could reasonably expect even better results than anticipated by the sub-committee.

Control and Management.

This is so vital to the success of this or any scheme that before expressing an opinion I will quote the suggestion of the sub-committee, and endorsed by the Public Works Standing Committee, *i.e.*:—

That the scheme should be controlled by a Board of three Government representatives and two private members, composed as follows:—

(*a*) Three Government representatives:—(1) the Railways; (2) the Harbors Board; (3) the Department of Agriculture.

(*b*) Two private members:—(1) a representative of the wheatgrowers; (2) a representative of the wheat merchants.

On first sight, and after the recent experience of a board of Government nominees controlling farmers, it is apparent that the suggested composition of the Board will not meet with the approval of the producers with its ratio of 4 to 1; and seeing that the whole success of the scheme depends on the co-operation of the wheatgrowers, their views must be given every consideration before any definite decision is arrived at.

Throughout the whole of the State there is strong opposition to any form of Government control of bulk handling, and the concensus of opinion is that the

scheme should be financed, operated and controlled by a co-operative company of farmers and private enterprise. There is a possibility of some such system being established.

The control of the scheme by any one firm to the exclusion of the farmers would also meet with a very cool reception; but there is one point which must not be overlooked, and that is *that a farmer only possesses an interest in silo-stored wheat so long as he retains his warrant,* and immediately he sells the ownership of the wheat passes to the buyer, who, in all fairness, is surely entitled to some voice in its control.

Displacement of labour at sidings and terminals is often advanced as an argument against bulk handling, but the displacement of labour by the introduction of machinery which assists in industry should not be taken into consideration or borne by any single industry, but should be borne by the nation, as is the case with labour displaced by machinery.

GENERAL.

Seeing the sub-committee, after an exhaustive inquiry into all systems of bulk handling and careful consideration of all evidence tendered, saw fit to express the following:—"The sub-committee is definitely of the opinion that bulk handling is warranted in South Australia," and that the finding of the Public Works Standing Committee was, "that, in the interests of the wheat producer, it is desirable to introduce a system of bulk handling of wheat into South Australia on the lines recommended by the Bulk of Handling of Wheat Sub-Committee," one has no hesitation in recommending a suitable system of bulk handling to the favourable consideration of farmers in South Australia.

CARE OF CALVES ON THE FARM.

[T. W. WILSON, Alawoona.]

Usually the first job with the young calf is to teach it discipline, and to drink from the bucket at the same time.

With this object in view, a strap should be buckled around its neck, to which a short rope can be fastened. The calf should be kept tied up until it learns to drink readily from the bucket, thus saving the time of having to chase it around the yard to feed it. New milk is given to the calf for about a fortnight; then this can be broken down with skim milk, gradually decreasing the new milk until the calf has skim milk only.

Three weeks is long enough to keep the calf tied up. It should be allowed to run around the yard at that stage, but the strap should be left on its neck for handling occasionally.

So soon as the calf shows any inclination to chew, place a box in the yard with a few handfuls of hay chaff in it and a little crushed oats or bran. The calf will soon take to this ration, and will thrive and grow faster than if fed on milk only.

Calves are better in every way if they get some skim milk until they are three months old, in addition to the chaff and corn ration, unless there is an abundance of good green feed.

It is not uncommon to see pot-bellied, unshapely yearling calves on some farms, which is mainly due to the fact that they have been turned out too early to fend for themselves. However good the blood strain of the stock may be, insufficient feed in their early lives will spoil them for stud purposes.

In the case of yearling heifers, these still need some hand-feeding in the autumn and early winter periods, when the young feed does not contain sufficient strength for the requirements of young stock. Cocky chaff will help to keep them from slipping back at this time, and give them something solid to chew at night.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on November 28th, there being present Messrs. A. J. Cooke (Chairman), J. W. Sandford, S. Shepherd, F. Coleman, Hon. A. L. McEwin, M.L.C., Professor A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary). Apologies were received from Messrs. A. J. Koch, J. B. Murdoch, and H. N. Wicks.

On behalf of the Board the Chairman extended congratulations to Mr. McEwin on his being elected a member of the Legislative Council.

The Chairman also welcomed Mr. Shepherd on his return from a trip overseas.

The Secretary reported that on October 31st Messrs. A. M. Dawkins, Professor Perkins, P. J. Baily, and A. L. McEwin met as a committee at Roseworthy College and disposed of several items subject to confirmation by the Board. The action taken in each case has been confirmed and the items are indicated below by the date (October 31st).

Branch to be Closed—Kuitpo (October 31st).—This Branch was closed, members having decided to join the Mount Compass Branch.

New Branch (October 31st).—The formation of a Woman's Branch at Boor's Plains was confirmed, the following ladies being enrolled as foundation members:—Mesdames T. Stanway, S. Chynoweth, N. Cross, M. Wright, H. Queale, T., C., and G. Rodda, M. and A. Yelland, R. Ward, A. Adams, Misses L. Stanway,* B. Chynoweth, and A. Cross.

Life Members.—Life membership of the Agricultural Bureau was conferred on Messrs. H. K. Gum, Willowie (October 31st); H. G. Johnston, Parilla; H. J. Dennis, Inman Valley; H. R. Lines and E. J. Pech, Laura; B. C. Joppich, C. H. Curnow, W. H. Jettner, and W. Stephens, Wirrabara.

New Members (October 31st).—The following names were added to the rolls of existing Branches:—Berri—N. S. Wilksch; Kybybolite Women's—Mrs. S. Shepherd; Hope Forest and Dingabledinga—Mrs. G. De Caux; Tantanoola Women's—Mrs. E. Hannan; Parilla Well—R. Johnston, A. Johnston, C. M. Houston, E. H. Thiele, A. Werner; Gladstone Women's—Mrs. Anderson; Laura Bay Women's—Mrs. A. B. Nicholls; Koolunga—R. Fuller; Tantanoola—E. D. Kiely, E. Hannan; Macclesfield —Mark Haines; McLaren Flat—T. C. Burgan; Myponga—F. Hooder, R. Skipper, G. Washington, A. McGuiness, J. Roberts; Stanley Flat—A. Turner, E. S. Dolan, W. Lee, R. J. Allen, F. Gerteau, H. Dack, W. E. Penfold; Butler—E. F. Pattenden; Kybybolite Women's—Mrs. G. Paltridge, Miss H. Watkins, Mrs. D. Chapple; Streaky Bay—A. W. J. Cook; Warcowie Women's—Mrs. L. G. Martin; Marama—E. Ware; Alma—Allan Day; Narrung—A. G. Robinson, G. Wyatt, A. Thompson, G. A. McNichol, Morchard Women's—F. Stainer; Wepowie—A. M. Ware, M. J. Gregurke; Yurgo—W. Matthew, R. Mullan; Finniss—W. Coonan; Ramco—L. C. Darling; Ramco —W. R. Stanley, G. Watkins; Cummins—J. R. Bergmann; Dudley—H. E. Wood, W. E. Dunn; Lone Gum and Monash—L. H. H. Bollenhagen; Frayville—G. N. Stott; Arthurton—C. Coleman; Kybybolite—F. R. Moore; Light's Pass—T. Gerlach; McLaren Flat—A. Sigston, J. Sigston, Jerold Shaw; Goode Women's—Mrs. C. Lutz; Penwortham—C. S. Wyman, A. W. Ahle; Murraytown—C. J. Woolford; Kyancutta—H. Walter; Lone Gum and Monash—L. Ellis; Tintinara—Stanley McIver; Barmera—A. E. Coates, W. Slaughter, C. Wyman; Wirrabara Women's—Mrs. V. Scholz, Mrs. A. Piper, Mrs. Albert Durwood; Wirrabara—P. Banfield, A. M. Mahood; Buchanan—W. Hansen; Echunga—E. Hay; Warcowie—T. J. Francis, P. J. Dee; Block E—R. Glasson; Lenswood and Forest Range—Jeff Green; Sheoak Log Women's—Miss T. Schwartz; Auburn Women's—Miss S. Shaw, Miss N. Evans; Ashbourne—O. C. Kirkham, R. C. Allingame, C. J. Pitt, K. M. Horwood, R. D. Meyer, E. W. Jarman, F. White, O. G. Watson, J. Watson; Balhannah—W. Johnson; Belalie Women's—Miss M. Neale, Mrs. Gregory, Mrs. A. Beaven, Mrs. Gilfillan, Miss Jean Cummings, Mrs. Kurtzer; Belvidere—S. J. Cheriton; Berri—E. J. Wellby; Boor's Plains Women's—Mrs. C. Yelland, Mrs. T. Petherick; Clare Women's—Mrs. W. J. Fergusson, Mrs. S. C. Lee, Mrs. H. Woods; Coonawarra—John Redman, Kenneth Allder, Norman Redman, Owen Skinner, Richard Modistach, R. Lear; Coonawarra Women's—Mrs. P. C. Stafford, Miss Mary Redman; Echunga—J. L. S. Bice; Hanson—Lyall Turner, Mrs. C. P. Turner, R. W. Humphrys, W. Woollacott, jun., A Lucas, T. E. Goodridge, H. J. Clements, F., E., and J. Goodridge; Kelly—W. Ferguson; Lameroo—V. J. Cottrell; Laura—G. Cleggett; Laura Bay Women's—Miss. G. M. Nicholls; Light's Pass—R. B. Williams; Lipson—C. E. Gale, C. M. Octoman, W. Franks; MacGillivray—J. Elsegoode, A. Waller; Marama—W. Ruskin; McLaren Flat Women's—Mrs. F. Crawford; Milang—A. A. Anderson, C. Tuckwell; Miltalie—Roy Jacobs, Arthur Bartel, Jack Bagnell, Frank Bagnell, L. J. Jackson, L. Jackson, jun., Horace Ramsey; Mount Bryan—H. L. Foot, Eric Simpson; Mount Gambier—H. L. Kennedy, J. R. Nunan, R. J. Nunan; Mundalla Women's—Miss A. Adams; Murray Bridge—L. H. Christian; Nelshaby—Henry Noll; Owen—Roy Wood, M. Galbraith; Parilla—G. E. Harding, H. K. Harding; Parilla Women's—Mrs. C. G. Smitham; Penola Women's—Miss Heather Clifford; Pinnaroo Women's—Mrs. J. Hanton, Miss Roma Hanton, Miss Dorothy Dowd, Mrs. G. Nickols, Mrs. A. Gustafson, Miss Alma Beck; Saddleworth—Alan Fraser, W. O. Coleman, Eric Wadley, J. G. Rogers, E. Lawson, Laurie Bagshaw, Keith Bagshaw; Snowtown Women's—Mrs. C. S. Lovelock; Strathalbyn—J. W. Ansell, J. S. Richardson, N. A. Palmer; Taplan Women's—Mrs. Galley; Truro—P. H. Linke; Willowie—R. I. Crisp; Wilmington Women's—Mrs. Dennis, jun., Mrs. W. Noll; Brownlow—A. J. Schmidt, B. H. Schmidt.

Present number of Branches, 341; present number of members, 7,594.

A number of items were considered in Committee.

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. SANDFORD & Co., LIMITED, reported on December 1st, 1934:—

BUTTER.—Weather conditions during November were very favourable for dairymen because with the cool weather and showers received the feed was kept going and milk supplies, therefore, did not fall back to any great extent. There has been a gradual decline since the peak of the season in October but has now steadied and production should maintain throughout December. The London market showed some improvement and hardening in values but afterwards was back again and at present the rates are 70s. to 71s. per cwt. Local trade was well maintained and with the decrease in dairy butter there are now greater quantities of factory prints selling locally. The following are prices ruling at present:—Choicest creamery fresh butter in bulk, 1s. 3½d. per lb., prints and delivery extra (these prices are subject to stabilization levies); store and collectors lots, 5d. to 5½d. per lb. according to quality.

CHEESE—Reports from the South-East show that record quantities are being manufactured and it is expected that the total tonnage will be 50 per cent. over the previous record. Local and Westralian trade is absorbing good quantities each week but there is a considerable surplus going forward to London as freight can be arranged. Local values are:—Large and medium, from 8d. per lb.; loaf, from 8½ per lb. at store door; delivery extra; semi-matured and matured, 8½d. to 9d. per lb., whilst London rates are ruling from 45s. to 46s. 6d. per cwt.

EGGS.—Supplies have kept up fairly well and all of sufficiently high grade have been shipped to Britain. The intermittent warm weather during November affected some consignments so that the proportions of export quality lessened but, generally speaking, the supplies were satisfactory. Rates, as is usual at this time of the year, have eased with the London export season now drawing to a close and local rates are now—Ordinary country eggs, fair average quality, 6d. per dozen net; long distance rail or shipping eggs lower; export quality, clean eggs, 1⅞ozs. and over, up to 8½d. per dozen net.

BACON.—The demand for bacon kept up satisfactorily and the turnover was met by regular supplies from the factories each week. Sales of hams have increased to a large extent and manufacturers are working at high pressure preparing the Christmas hams. Local rates are—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 8½d. to 9d.; hams 1s. 1d. to 1s. 2d.; cooked, 1s. 3d. to 1s. 4d. per lb.

ALMONDS.—Have been in keen demand, buyers purchasing extra stocks for the Christmas trade, and values firmed. Softshells and Brandis, 9½d. to 10d. per lb.; hardshells, 5½d. to 6d. per lb.; kernels, 1s. 11½d. to 2s. 0½d. per lb.

HONEY.—Sales continued dull throughout the month although the quality of many lines was very satisfactory. Considerable stocks are held by city wholesalers and also by apiarists. Rates at present are:—Prime quality clear extracted, 2¾d. to 3¼d. per lb.; lower grades, 1¾d. to 2¼d. per lb.

BEESWAX.—Met with strong demand and supplies were inadequate. Rates are—1s. 4d. to 1s. 4½d. per lb. according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday and Friday and our sale rooms are the best equipped in the State. Increasing supplies came to hand at recent sales and no doubt will improve during the next week or two. As poulterers and others are short of stocks and require large quantities for the Christmas trade keen buying was experienced at each of the auction sales held. It is expected that firmer prices will rule for prime quality stock but poorer sorts which are not suitable for table purposes do not command such keen attention. We advise consigning promptly. Crates loaned free on application. The folowing prices relised—Prime roosters, 4s. 3d. to 5s 6d.; nice conditioned cockerels, 3s. 5d. to 3s. 11d.; fair conditioned cockerels, 2s. 6d. to 3s. 3d.; chickens lower; heavy weight hens, 2s. 9d. to 3s. 4d.; medium hens, 2s. to 2s. 8d.; light hens, 1s. 5d. to 1s. 11d.; couple of pens of weedy sorts lower; prime young Muscovy drakes 5s. 3d. to 6s. 6d.; young Muscovy ducks, 3s. to 3s. 9d.; ordinary ducks, 1s. 1d. to 2s. 6d.; ducklings lower; geese, 4s. 6d. to 6s.; goslings, 3s. 6d. to 4s.; turkeys, good to prime condition, 10d. to 1s. 1d. per lb. live weight; turkeys, fair condition, 7½d. to 9½d. per lb. live weight; turkeys, poor and crooked breasted lower; pigeons, 3½d. to 4½d. each.

POTATOES.—New Season's, 12s. per cwt.

ONIONS.—New Season's, 10s. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., OCTOBER, 1934.

IMPORTS.

Interstate.

Apples (bushels)	43	Swedes (bags)	3
Bananas (bushels)	11,114½	Bulbs (packages)	14
Citrus—		Plants, Ornamental (packages)	73
Grape Fruit (bushels)	103	Seeds (packages)	73
Lemons (bushel)	1	Shrubs (packages)	2
Oranges (bushels)	8	Trees, Fruit (packages)	2
Passion Fruit (bushels)	154½	Wine Casks (No.)	2,764
Paw Paws (bushels)	20		
Pineapples (bushels)	1,390½	*Fumigated*—	
Nuts—		Wine Casks (No.)	17
Peanuts (bags)	1,848		
Peanuts, Kernels (bags)	42	*Rejected*—	
Pine (bag)	1	Bananas (bushels)	10½
Beans (bushels)	26	Citrus—	
Cucumbers (bushels)	990½	Lemons (bushel)	1
Onions (bags)	1,924	Plants, Ornamental (package)	1
Potatoes (bags)	5,081	Second-hand cases (No.)	12

Overseas.

(State Law.)

Wine casks (No.)	936	*Fumigated*—Wine casks (No.)	44

Federal Quarantine Act.

	Packages.	lbs.		Packages.	lbs.
Seeds, &c.	1,419	207,855	Tea chests	2,040	—
Canes	224	—	Timber	309,755	9,254,362 sup. ft.
Cocoanut chests	273	—			

EXPORTS.

Federal Commerce Act.

		Packages.			Packages.
Netherlands, East Indies	Vegetables*	6	Singapore	Citrus—Lemons	14
				Vegetables*	47
New Zealand	Citrus—Oranges	44,722	Straits Settlements	Vegetables*	6

* Potatoes excluded.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of November, 1934, also the average precipitation for November, and the average annual rainfall.

Station.	For Nov. 1934.	Av'ge. for Nov.	Av'ge. Annual Rain-fall.
Far North and Upper North.			
Oodnadatta	0·59	0·35	4·69
Marree	0·9	0·45	5·93
Farina	0·61	0·48	6·48
Copley	1·87	0·53	7·93
Beltana	1·96	0·65	8·53
Blinman	2·15	0·84	11·92
Hookina	2·95	0·78	11·46
Hawker	3·09	0·88	12·31
Wilson	3·49	0·84	11·82
Gordon	2·34	0·79	10·59
Quorn	2·59	0·87	13·29
Port Augusta	1·13	0·68	9·46
Bruce	1·98	0·71	9·95
Hammond	1·45	0·76	11·27
Wilmington	2·42	0·98	17·43
Willowie	2·02	0·75	12·28
Melrose	2·78	1·24	22·94
Booleroo Centre	2·27	0·83	15·23
Port Germein	1·31	0·79	12·55
Wirrabara	2·28	1·09	19·34
Appila	3·52	0·87	14·66
Cradock	2·75	0·71	10·83
Carrieton	2·62	0·79	12·29
Johnburg	2·78	0·80	10·59
Eurelia	2·51	0·94	12·85
Orroroo	2·25	0·95	13·23
Nackara	2·38	0·84	11·18
Black Rock	2·21	0·91	12·43
Oodlawirra	3·60	0·83	11·67
Peterborough	3·07	0·95	13·27
Yongala	3·41	1·00	14·47
North-East.			
Yunta	1·39	0·77	8·54
Waukaringa	1·79	0·66	7·97
Mannahill	1·67	0·75	8·21
Cockburn	1·27	0·75	7·98
Broken Hill, N.S.W.	1·53	0·76	9·57
Lower North.			
Port Pirie	1·50	0·76	13·26
Port Broughton	1·54	0·71	13·92
Bute	2·91	0·75	15·49
Laura	2·14	1·04	17·99
Caltowie	4·17	1·07	16·75
Jamestown	5·57	1·07	17·75
Gladstone	2·97	1·01	16·33
Crystal Brook	1·24	0·91	15·82
Georgetown	1·28	1·02	18·41
Narridy	1·49	0·87	15·88
Redhill	1·86	0·86	16·61
Spalding	2·36	1·09	18·99
Gulnare	1·91	1·06	18·71
Yacka	2·46	0·82	15·40
Koolunga	1·73	0·79	15·43
Snowtown	1·82	0·87	15·71
Lower North—*continued*.			
Brinkworth	1·71	0·83	15·83
Blyth	1·73	0·91	16·80
Clare	3·06	1·28	24·56
Mintaro	3·93	1·09	23·47
Watervale	3·32	1·37	26·91
Auburn	2·98	1·31	24·00
Hoyleton	1·66	1·02	17·35
Balaklava	1·71	0·94	15·49
Port Wakefield	1·49	0·70	12·96
Terowie	3·41	0·89	13·40
Yarcowie	2·95	0·88	13·63
Hallett	2·65	1·03	16·48
Mount Bryan	2·47	0·86	16·81
Kooringa	1·76	0·92	17·92
Farrell's Flat	1·33	0·93	18·68
West of Murray Range.			
Manoora	2·66	0·96	18·93
Saddleworth	1·98	1·13	19·61
Marrabel	1·94	1·10	19·94
Riverton	2·04	1·22	20·81
Tarlee	1·75	1·13	18·13
Stockport	2·52	1·03	16·97
Hamley Bridge	2·09	0·94	16·61
Kapunda	1·91	1·13	19·82
Freeling	1·70	1·05	17·88
Greenock	1·90	1·26	21·57
Truro	1·61	1·15	19·95
Stockwell	1·51	1·23	20·17
Nuriootpa	1·87	1·14	20·72
Angaston	1·94	1·27	22·47
Tanunda	1·39	1·20	22·03
Lyndoch	2·24	1·19	23·46
Williamstown	2·88	1·36	27·77
Adelaide Plains.			
Owen	2·43	0·69	14·53
Mallala	1·77	0·94	16·59
Roseworthy	2·47	0·99	17·39
Gawler	1·83	1·04	18·97
Two Wells	2·55	0·82	15·75
Virginia	3·39	0·92	17·1
Smithfield	3·08	0·98	17·65
Salisbury	3·14	1·00	18·59
Adelaide	4·10	1·12	21·1
Glen Osmond	4·01	1·18	26·0
Magill	2·38	1·23	25·6
Mount Lofty Ranges.			
Teatree Gully	3·18	1·44	27·33
Stirling West	5·39	2·07	47·05
Uraidla	3·50	1·89	44·19
Clarendon	3·71	1·51	32·89
Morphett Vale	2·59	1·20	22·68
Noarlunga	2·27	1·01	20·41
Willunga	2·21	1·21	26·03
Aldinga	1·42	0·94	20·28

RAINFALL—*continued.*

Station.	For Nov. 1934.	Av'ge. for Nov.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*			
Myponga	2·35	1·36	29·68
Normanville	1·89	0·97	20·73
Yankalilla	2·14	1·04	22·90
Mount Pleasant	2·55	1·30	27·24
Birdwood	3·55	1·38	29·24
Gumeracha	3·47	1·63	33·44
Millbrook Res.	3·25	1·54	34·82
Tweedvale	4·37	1·57	35·97
Woodside	3·50	1·47	32·30
Ambleside	3·27	1·57	34·90
Nairne	3·30	1·38	28·17
Mount Barker	2·87	1·49	31·97
Echunga	4·46	1·55	33·26
Macclesfield	3·95	1·63	30·44
Meadows	4·17	1·83	36·21
Strathalbyn	2·43	1·07	19·32
Murray Flats and Valley			
Meningie	1·88	1·02	18·42
Milang	1·60	0·89	14·97
Langhorne's Ck.	2·39	1·00	14·90
Wellington	2·00	0·91	14·70
Tailem Bend	2·11	0·89	15·08
Murray Bridge	1·65	0·86	13·64
Callington	1·83	0·89	15·22
Mannum	1·14	0·69	11·53
Palmer	2·81	0·87	15·55
Sedan	0·93	0·70	12·11
Swan Reach	2·00	0·66	10·62
Blanchetown	1·54	0·71	11·03
Eudunda	1·97	1·06	17·18
Sutherlands	1·66	0·76	10·88
Morgan	1·08	0·63	9·21
Waikerie	2·02	0·63	9·70
Overland Corner	0·72	0·79	10·37
Loxton	0·82	0·71	11·65
Berri	1·43	0·73	10·32
Renmark	1·51	0·52	10·49
West of Spencer's Gulf			
Eucla	0·56	0·66	9·98
Nullarbor	1·16	0·54	8·84
Fowler's Bay	1·84	0·57	11·93
Penong	1·23	0·58	12·23
Koonibba	1·44	0·65	12·11
Denial Bay	1·11	0·55	11·52
Ceduna	1·85	0·60	10·16
Smoky Bay	1·58	0·49	10·51
Wirrulla	2·04	0·46	10·50
Streaky Bay	1·72	0·65	14·88
Chandada	1·31	—	—
Minnipa	1·23	0·71	13·87
Kyancutta	1·29	—	—
Talia	1·20	0·66	14·63
Port Elliston	1·94	0·68	16·50
Yeelanna	2·09	0·60	16·02
Cummins	1·96	0·71	17·61
Port Lincoln	1·37	0·85	19·43
Tumby	1·40	0·84	14·14
Ungarra	2·05	0·91	16·87
Port Neil	1·40	0·86	13·16

Station.	For Nov. 1934.	Av'ge. for Nov.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—*continued.*			
Arno Bay	1·96	0·69	12·63
Rudall	2·48	0·83	13·12
Cleve	3·13	0·89	14·79
Cowell	2·06	0·66	11·1[illegible]
Miltalie	2·24	0·85	13·64
Darke's Peak	1·74	0·73	15·23
Kimba	1·57	0·60	11·84
Yorke Peninsula.			
Wallaroo	2·32	0·70	13·99
Kadina	2·28	0·72	15·69
Moonta	2·97	0·73	15·10
Paskeville	2·65	0·70	15·52
Maitland	2·39	1·00	19·97
Ardrossan	2·77	0·74	13·98
Port Victoria	1·99	0·81	15·49
Curramulka	1·75	0·83	17·95
Minlaton	1·75	0·90	17·85
Port Vincent	1·59	0·75	14·50
Brentwood	1·16	0·85	15·58
Stansbury	1·41	0·83	16·84
Warooka	0·97	0·79	17·53
Yorketown	1·01	0·85	16·94
Edithburgh	1·15	0·89	16·49
South and South-East.			
Cape Borda	1·79	0·97	24·86
Kingscote	1·59	0·89	19·16
Penneshaw	2·10	0·97	19·02
Victor Harbour	1·75	1·09	21·42
Port Elliot	1·32	1·10	19·95
Goolwa	1·93	1·05	17·87
Copeville	1·72	0·69	11·57
Meribah	1·45	0·47	11·46
Alawoona	1·11	0·47	10·29
Mindarie	2·02	0·74	12·22
Sandalwood	2·73	0·79	13·73
Karoonda	0·82	0·75	14·48
Pinnaroo	2·30	0·95	14·57
Parilla	1·36	0·83	14·01
Lameroo	1·41	0·95	16·10
Parrakie	1·72	0·81	14·64
Geranium	1·43	0·92	16·53
Peake	1·16	0·83	16·13
Cooke's Plains	1·72	0·87	15·43
Coomandook	2·63	1·00	17·20
Coonalpyn	3·14	0·98	17·53
Tintinara	2·43	1·14	18·73
Keith	2·00	1·14	17·96
Bordertown	2·49	1·20	19·26
Wolseley	2·95	1·09	18·52
Frances	2·91	1·25	20·01
Naracoorte	3·03	1·35	22·63
Penola	3·61	1·51	26·05
Lucindale	2·62	1·19	23·29
Kingston	2·25	1·19	24·37
Robe	2·21	1·05	24·68
Beachport	2·54	1·14	27·07
Millicent	3·45	1·43	29·81
Kalangadoo	5·72	1·87	32·38
Mount Gambier	3·07	1·73	30·55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.	
		Dec.	Jan.
Adelaide	*	—	—
Alawoona	*	—	—
Allandale East	†	21	18
Alma	*	—	—
Appila-Yarcowie	†	R	R
Arthurton	*	—	—
Ashbourne	*	19	16
Auburn Women's	†	R	25
Balaklava	*	R	R
Balhannah	*	—	—
Balhannah Women's	*	—	—
Balumbah	†	—	—
Balumbah Women's	†	5	R
Beetaloo Valley	*	17	14
Belalie Women's	†	12	R
Berri	*	18	15
Belvidere	*	—	—
Blackheath	†	27	24
Black Rock	*	—	—
Black Springs	*	R	R
Blackwood	*	10	14
Blyth	*	28	25
Booborowie	*	17	14
Booleroo Centre	*	21	18
Boolgun	*	—	—
Boor's Plains	†	R	R
Boor's Plains Women's	†	—	—
Borrika	*	—	—
Bowhill	*	17	14
Brentwood	*	6	3
Brinkley	*	19	16
Brinkworth	*	17	14
Brownlow	†	—	—
Buchanan	†	—	—
Bute	*	R	R
Butler	*	—	—
Caliph	*	4	—
Caralue	*	19	16
Carrow	*	19	16
Ceduna	*	—	—
Chandada	†	—	—
Charra	*	—	—
Cherry Gardens	†	—	—
Chilpuddie Rock	†	—	—
Clare Women's	†	1	5
Clarendon	*	17	14
Cleve	*	1	5
Collie	*	5	2
Coomandook	†	R	R
Coonawarra	†	20	31
Coonawarra Women's	*	19	16
Cummins	*	14	11
Cungena	*	6	3
Currency Creek	*	24	21
Dudley	*	—	—
Echunga	†	12	9
Elbow Hill	*	20	17
Eudunda	*	3	7
Eurelia	*	8	12
Eurelia Women's	†	5	2
Farrell's Flat	*	28	25
Finniss	†	—	—
Frances	*	—	—
Frayville	*	—	—
Gawler River	*	—	—
Georgetown	*	15	19
Geranium	*	29	26
Gladstone	*	21	18
Gladstone Women's	†	18	22
Glencoe	*	11	8
Goode	*	—	—
Goode Women's	*	—	—
Greenock	†	17	21
Green Patch	†	20	17
Gumeracha	*	17	21
Hanson	*	18	15
Hartley	†	19	16
Hindmarsh Island	*	—	—
Hope Forest	†	8	7
Hope Forest Women's	†	—	—
Hoyleton	*	17	21
Inman Valley	†	20	17
Jamestown	*	19	16
Jervois	†	13	10
Kalangadoo Women's	*	8	12
Kalangadoo	*	8	12
Kalyan	*	19	16
Kangarilla Women's	†	20	R
Kanni	*	—	—
Kapinnie	*	—	—
Kapunda	*	14	11
Karoonda	*	19	23
Keith	*	20	17
Kelly	†	1	R
Ki Ki	*	—	—
Kilkerran	*	20	17
Kongorong	*	17	14
Koolunga	*	—	—
Koonibba	*	20	17
Koonunga	†	—	—
Koppio	†	19	23
Kringin	*	24	21
Kulkawirra	*	R	R
Kyancutta	*	4	—
Kybybolite	*	18	15
Kybybolite Women's	*	18	R
Lameroo	†	15	19
Langhorne's Creek	*	19	16
Laura	*	R	R
Laura Bay	*	—	—
Laura Bay Women's	†	11	8
Lenswood and Forest Range	*	—	—
Light's Pass	†	—	—
Lipson	†	15	R
Lone Gum and Monash	*	19	17
Lone Pine	*	17	14
Lowbank	*	19	16
Loxton	*	14	11
Lyndoch	*	18	15
McLaren Flat	*	—	—
McLaren Flat Women's	†	6	R
Macclesfield	†	20	17
MacGillivray	*	18	15
Mallala	*	17	21
Maltee	*	20	17
Mangalo	*	—	—
Mangalo Women's	*	12	9
Marama	†	—	R
Meadows	*	19	16
Milang	†	15	19
Millicent	*	R	R
Millicent Women's	*	R	R
Miltalie	†	15	9
Monarto South	*	—	—

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. Dec.	Dates of Meetings. Jan.
Monarto South Women's	†	15	19
Moorlands	*	—	23
Morchard	*	R	R
Morchard Women's	*	—	23
Mount Barker	*	17	21
Mount Bryan	†	—	—
Mount Compass	*	—	—
Mount Gambier	†	14	11
Mount Hope	†	18	R
Mount Pleasant	*	14	11
Mudamuckla	*	8	12
Mundalla	*	—	—
Mundalla Women's	†	20	17
Murray Bridge	*	R	R
Murraytown	*	—	—
Mypolonga	*	—	—
Myponga	*	20	17
Myrla	*	19	16
Nantawarra	*	20	17
Naracoorte	*	8	12
Narridy	*	—	—
Narrung	*	—	—
Nelshaby	*	—	—
Nelshaby Women's	*	—	—
Netherton	*	19	16
Nunjikompita	*	20	17
Nunkeri	*	20	17
O'Loughlin	*	10	14
O'Loughlin Women's	*	—	—
Overland Corner	*	19	16
Owen	*	10	14
Palabie	*	—	—
Parilla	*	18	15
Parilla Women's	*	19	16
Parilla Well	*	24	21
Parilla Well Women's	*	—	29
Parrakie	*	—	—
Parrakie Women's	*	—	29
Paruna	*	7	4
Paskeville	*	18	15
Pata	*	7	4
Penola	†	1	5
Penola Women's	†	—	—
Penwortham	*	19	16
Petersville	*	18	15
Petina	*	22	26
Pinbong	*	—	—
Pinnaroo	*	—	—
Pinnaroo Women's	†	7	R
Port Elliot	*	—	—
Pygery	*	18	15
Pygery Women's	*	—	—
Quorn	*	—	—
Ramco	*	17	14
Redhill	†	—	—
Rendelsham	†	16	19
Rendelsham Women's	†	—	—
Renmark	*	—	—
Riverton	†	10	14
Roberts and Verran	*	—	R
Rosedale	*	—	—
Roseworthy	*	—	—
Rudall	*	18	15
Saddleworth	†	21	18
Saddleworth Women's	†	4	—
Scott's Bottom	†	15	19
Sheoak Log Women's	†	—	—
Shoal Bay	*	18	15
Smoky Bay	*	—	—
Snowtown	*	14	11
Snowtown Women's	†	R	R
South Kilkerran	*	18	15
Springton	*	5	2
Stanley Flat	*	17	21
Stockport	*	R	R
Strathalbyn	*	12	9
Streaky Bay	*	—	25
Sutherlands	*	—	—
Talia	*	—	25
Tantanoola	†	1	5
Tantanoola Women's	†	5	2
Taplan	†	18	R
Taplan Women's	†	—	—
Taragoro	†	20	17
Tarlee	*	—	—
Tatiara	*	—	—
Tintinara	*	—	—
Truro	†	R	21
Tulkineara	*	20	17
Tweedvale	*	20	17
Ungarra	*	27	24
Upper Wakefield	*	—	—
Uraidla and Summerton	*	3	7
Waddikee Rocks	*	15	19
Waikerie	*	14	11
Wallala	†	12	R
Wanbi	*	—	23
Wandearah	*	18	15
Warcowie	*	18	15
Warcowie Women's	*	—	—
Warramboo	†	18	R
Warramboo Women's	†	R	R
Wasleys	†	13	10
Wasleys Women's	*	6	3
Watervale	*	17	21
Waurultee	*	18	15
Weavers	†	10	R
Wepowie	*	17	14
Wepowie Women's	*	—	—
Wilkawatt Women's	*	18	—
Williamstown Women's	†	5	2
Willowie	*	24	28
Wilmington	†	18	R
Wilmington Women's	†	—	—
Wirrabara	*	—	—
Wirrabara Women's	*	—	—
Wirrilla	*	R	R
Wirrilla Women's	*	6	10
Wirrulla	*	19	16
Wolseley	*	10	14
Wudinna	†	—	—
Yadnarie	*	18	15
Yandiah	*	14	11
Yaninee	*	—	—
Yeelanna	*	19	16
Yundi	*	19	16
Yurgo	†	—	—
Yurgo Women's		—	—

* No reports received during the month of November. † Held over.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying.	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

Because of the demand for space and the large number of Bureau Reports on hand, we have been reluctantly compelled to include many papers read at Bureau meetings in "Other Reports Received."—Editor.

SOUTH-EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Tantanoola	4/8/34	18	Address—W. H. Downes	L. Osborne
Mount Gambier	10/8/34	12	"Lucerne Flea," J. Morphett	G. Gurry
Rendelsham ...	25/8/34	9	"Wool and Lambs," W. Andrews	F. Todd, Jnr.
Frances	19/9/34	5	"Shearing Machine Hand Piece," Mr. Koch	E. Herold
Tantanoola	29/9/34	13	Discussion	L. Osborne
Mount Gambier	28/9/34	14	Address—A. L. Warren .	G. Gurry
Mount Gambier	2/11/34	14	Congress Report	G. Gurry
Allandale East .	19/10/34	8	Question Box	J. Laslett
Mundalla	25/10/34	30	Address—H. C. Trumble, M.Sc.	A. Ross
Rendelsham ...	29/10/34	18	Address—A. H. Codrington	F. Todd
Penola	6/11/34	6	Congress Report	F. Hinze
Coonawarra	25/10/34	16	"Fertilizers," H. Richardson	J. Kain
Tantanoola	27/10/34	18	Address—A. H. Codrington	L. Osborne

MIDDLE NORTH DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Narridy	29/9/34	7	"Haymaking," E. Klingner	J. Klingner
Booborowie	27/9/34	7	"Tidiness on the Farm," A. Woodgate	A. Fairchild
Jamestown	24/9/34	8	"Bookkeeping," J. Murchland	B. Phillips
Beetaloo Valley.	17/9/34	12	Address—E. L. Orchard .	B. Giddings
Beetaloo Valley.	22/10/34	10	Address—E. L. Orchard .	B. Giddings
Murraytown ...	20/10/34	9	Congress Report	E. Pitman
Appila	19/10/34	9	Address—E. L. Orchard .	E. Wurst
Appila	2/11/34	10	Address—J. O. Hatter ..	E. Wurst
Redhill	30/10/34	10	Congress Report	S. Pengilly

UPPER NORTH DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Morchard	24/8/34	12	"Fodder Supplies," H. Kupke; "Spare Time Jobs," R. McCallum	E. Tilbrook
Wilmington	23/10/34	14	Paper—H. Carter	C. Cole
Warcowie	23/10/34	11	Paper from *Journal*	A. Crossman
Wilmington	13/11/34	15	"Grasshopper Problems"	C. Cole

WESTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Cummins	10/8/34	11	"Time Saving," M. Palm	K. Trigg
Balumbah	25/7/34	10	"Fencing," Mr. J. Swann	A. Jericho
Kelly	4/8/34	19	"Water Conservation," R. Mayfield	F. Illman
Mount Hope	21/8/34	6	"Gardening," H. Russell	J. Vigar
Laura Bay	11/9/34	16	"Tetanus," W Edson	P. Morrison
Wallala	12/9/34	6	"Scrub Clearing," W. Baldock	C. Zippel
Green Patch	21/9/34	8	"Wool Classing," M. Derrington	C. Whillas
Nunjikompita	28/9/34	15	"Rabbit Destruction," H. Luestner	P. Luestner
Koppio	23/8/34	11	"Stinkwort Poisoning," M. Gardner	M. Gardner
Warramboo	28/9/34	9	"Haymaking," H. McKenzie	F. Chilman
Butler	21/9/34	12	Discussion	C. Jericho
Goode	19/9/34	11	"Pigs," A. Howlett	E. Fear
Mangalo	2/10/34	—	"Lucerne," F. Coles; "The Agricultural Instructors" S. Hannemann; "Weather Forecasting," F. Coles	R. Turner
Chilpuddie	26/9/34	20	Address—W. H. Brownrigg	H. Brown
Green Patch	25/10/34	7	"Marketing Oats," C. Whillas	C. Whillas
Koppio	6/9/34	7	"Lowering Farm Costs," V. Gardner	M. Gardner
Koppio	24/10/34	7	Discussion	M. Gardner
Warramboo	26/10/34	9	Congress Report	F. Chilman
Miltalie	27/10/34	20	"Wheat Growing," L. Jackson	G. Smith
Wudinna	10/9/34	8	Congress Report	D. Duguid
Kelly	3/11/34	21	Congress Report	F. Illman

EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Moorlands	11/7/34	11	"Size of Farm Holdings," A. Mann	R. Wilmshurst
Ramco	20/8/34	6	"Manuring," F. Burroughs	J. Odgers
Yurgo	24/9/34	15	"The Brood Mare," E. Easton	H. McKenzie
Marama	29/9/34	6	Discussion	T. Hinkley
Nunkeri	20/9/34	11	"Dairying," E. A. Peltz	E. Peltz
Nunkeri	25/10/34	14	Homestead Meeting	E. Peltz
Renmark	17/10/34	—	Address—A. V. Lyon, B.Sc.	V. Prider
Ramco	17/9/34	6	"Items of Interest," J. Odgers	J. Odgers
Ramco	29/10/34	6	Discussion	J. Odgers
Taplan	24/10/34	8	Congress Report	P. Hodge
Coomandook	26/10/34	5	"Water Supplies," C. Wilson	W. Trestrail
Lameroo	2/11/34	12	"Chamber of Rural Production," L. Orwell	A. Potter
Marama	14/11/34	10	Congress Report	T. Hinkley
Yurgo	23/10/34	15	Field Day	H. McKenzie

LOWER-NORTH DISTRICT.
(ADELAIDE TO FARRELL'S FLAT.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Greenock	20/8/34	22	"Soils," E. Heyne	A. Schubert
Dudley	18/8/34	12	"Farm Machinery," W. Roach	D. Telfer
Lone Pine	24/9/34	14	"Remodelling the Farm Homestead," A. Fromm	S. Turnbull
Riverton	7/9/34	30	Address—C. Goddard	O. Longbottom
Alma	25/9/34	12	Address—F. Coleman	E. Drescher
Buchanan	9/10/34	8	Papers—Mr. Hicks	L. Bell
Stockport	5/10/34	7	Discussion	L. Klaffer
Penwortham	3/10/34	9	Discussion	A. Jenner
Koonunga	17/10/34	16	Congress Report	H. Mibus
Light's Pass	22/10/34	22	Congress Report	C. Verrall
Truro	22/10/34	35	Visit to R.A.C.	L. Davis
Snowtown	25/10/34	13	Congress Report	A. Hocking
Buchanan	25/10/34	17	Congress Report	L. Bell
Brownlow	24/10/34	15	"Farm Buildings," M. Scholz	A. Steinborner
Wasleys	18/10/34	12	"The Dairy Bill," E. H. Fischer	C. Currie
Saddleworth	6/9/34	—	Address—C. Goddard	F. W. Coleman
Saddleworth	26/10/34	—	"The Binder," R. Hannaford	F. W. Coleman
Saddleworth	5/11/34	—	Visit to R.A.C.	F. W. Coleman
Riverton	5/11/34	11	Address—A. Hannaford	O. Longbottom

YORKE PENINSULA DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kilkerran	23/7/34	10	"Treatment of Fallow," C. Rechner	A. Sawade
Brentwood	8/8/34	12	"The Dairy Herd" G. Boundy	J. Boundy
Boor's Plains	6/9/34	17	"Draught Preparations" S. Chynoweth	S. Chynoweth
Arthurton	11/9/34	11	"Cultivator *v.* Plough," Messrs L. Short and C. Hicks	T. Howlett
Upper Wakefield	27/9/34	75	Addresses—C. F. Anderson and F. C. Richards	C. Neumann
Boor's Plains	4/10/34	31	Address—W. C. Johnston	S. Chynoweth
Paskeville	18/10/34	8	"Horse Dipping," S. Pontifex	H. Perry
Boor's Plains	1/11/34	22	"Seed Wheat," E. Yelland	S. Chynoweth
Weavers	5/11/34	12	Congress Report	H. Cornish

SOUTH AND HILLS DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mount Pleasant	13/7/34	—	"Pig Breeding," J. Buckley	T. Philps
Blackheath	26/7/34	7	"Neatness on the Farm," R. Talbot	E. Paech
Yundi	15/8/34	—	"Farm Machinery," Mr. Smith	T. Smart
Kuitpo	22/8/34	9	"Beekeeping," H. Stone	J. Pickup
Clarendon	20/8/34	10	"Sidelines," J. R. Spencer	T. Brooks
Monarto South .	15/9/34	21	"Osmosis," W. Giles	C. Altmann
Frayville	20/9/34	12	Question Box	H. Ramm
Macclesfield	27/9/34	16	Address—R. Hill........	H. Ross
Hope Forest ...	1/10/34	17	"Gardening," Mr. Fisher	E. Muldoon
Blackheath	27/9/34	6	Paper from *Journal*	E. Paech
Hartley	17/10/34	8	Discussion	W. Brook
McLaren Flat...	18/10/34	16	Question Box	P. Wait
Monarto South .	20/10/34	21	Congress Report	C. Altmann
Macclesfield	18/10/34	11	Field Day	H. Ross
Lenswood and Forest Range	24/9/34	14	Question Box	B. Lawrance
Yundi	17/10/34	—	Address—Mr. Jacobs	T. Smart
Cherry Gardens	20/10/34	16	Homestead Meeting	A. Stone
Frayville	18/10/34	11	Congress Report	H. Ramm
Frayville	25/10/34	12	"Farm Horses," W. Faehrmann	H. Ramm
Inman Valley...	23/19/34	9	Address—H. H. Orchard	A. M. Fuller
Echunga	17/10/34	10	Homestead Meeting	L. Walters
Macclesfield	5/11/34	12	Address—A. Smith	H. Ross
Finniss	30/10/34	16	Address—H. B. Barlow .	L. Dunn
Milang	20/10/34	17	Discussion	L. Yelland
Scott's Bottom .	27/10/34	7	"Veterinary Science," Mr. Mitchell	E. Atkinson
Blackheath	1/11/34	7	Paper from *Journal*	E Paech
Jervois	4/10/34	23	Address—R. Hill........	F. Baily

Because of the demand for space and the large number of Bureau Reports on hand, we have been reluctantly compelled to include many papers read at Bureau meetings in "Other Reports Received."—Editor.

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

FORTY-FIFTH ANNUAL CONGRESS.

WOMEN'S BRANCHES.

THE USES OF DRIED FRUIT.

GREATER CONSUMPTION WILL HELP AUSTRALIAN PRODUCERS.

[Mrs. E. Allder, Coonawarra.]

The dietary value of dried fruit has been established as the result of years of scientific research. It has been proved that currants, sultanas, and raisins are the natural sources of vitamins and mineral salts. They are particularly rich in vitamin B, on which depends nerve health, and supply essential iron to the blood of old and young alike. Dried fruits can be combined well with other food substances, such as bread and suet, and in this way their nutritive value is increased. They also serve as an excellent source of fuel substance, to supply energy for hard work. This is the result of the large amount of sugar which they contain.

It has been found that in currants, sultanas and raisins fruit sugar is associated with the presence of mineral salts, which consist of potash and lime, which play an important part in preventing acid conditions in the tissues of the body. It is necessary that a generous supply of mineral salts should be obtained to counteract the effect of the acid-producing foods, which are consumed in large quantities.

Dietary studies show that because of a lack of knowledge of the nutritive value of foods whole families are often underfed; they can over-eat and still suffer from malnutrition. On the other hand, with proper food, healthy bodies can be built and supplied with all the energy required for mental and physical work. The value of fruit as an every day, all the year round article of diet for all ages and all classes has been demonstrated over and over again. The medical faculty throughout the world preaches this truth, too often to deaf ears, although in theory at least the usefulness of fruit in keeping the blood pure and the skin healthy is generally admitted.

The nourishing and sustaining power of fruit—especially, dried fruit, though less widely known—is now established beyond dispute by the most careful and repeated analysis, as well as the personal experience of many. A well-known medical man, writing on dietary, says:—"The juices of fruits, as of grapes, apricots, peaches, pears, nectarines, oranges, &c., have a most benign and purifying influence on the system." On the Continent people go to the vineyards in autumn and take the grape cure; they live for a few weeks entirely on bread and grapes, eating, say, half a pound of bread and several pounds of grapes a day, and are thereby so purified and invigorated that they can return with restored health to business, pleasure, and the luxuries and indulgences which are sure to bring disease.

Unfortunately the methods of preparing dried fruits for the table are but little known, and the abundance of cheap wholesome fruit thus brought within the reach of all, and available throughout the year, has in consequence hardly begun to be realised by those whose needs it is so well calculated to supply. In order to stimulate the consumption of these fruits I have decided to give a few simple recipes for preparation in a profitable but cheap form. Apart from the delicate and rich flavour of dried fruit jam, the housewife will recognise the very great convenience of being able to fill her shelves with home-made jam at any season of the year. For instance, she will find it an advantage to choose cool weather, or a time when the sugar is more plentiful. With all fruit care should be taken to avoid over-cooking, which causes the flesh to leave the fibre. The fruit should be served firm, and not mushy, the aim being to restore it to the original appearance and flavour of fresh fruit.

To prove the economical side of dried fruit, when you buy 1lb. of dried apricots, peaches or nectarines, that would be equal to 6lbs. of ripe fruit with only the moisture and stones removed.

All the health-giving properties of the fruit—vitamins, fruit sugar, and laxative juices—are retained, and soaking in water only is necessary to restore the fruit to its original size, colour and flavour. Not only is the fruit handy to have in the house for jam-making, but it is a great stand-by for pies, puddings, &c., for hot or cold days. One can always make a meal if there is a little dried fruit on hand. In the country, where one may live miles from a shop, dried fruit is absolutely necessary.

LUNCHES FOR CHILDREN.

Mothers are puzzled at times to know what to prepare as a lunch for the children. The following makes a nice, tasty, as well as nourishing tart:—

Australian Fruit Tart.

1 teacup dried apricots.
1 teacup dried prunes.
1 teacup raisins.

Australian Fruit Tart—continued.

1 level teacup sugar.
2 tablespoons chopped citron peel.
Juice of a small orange.
½ teaspoon grated nutmeg.
½ teaspoon ground cinnamon.
¼ teaspoon ground cloves.
½ teacup chopped almonds and walnuts.

Short pastry.—Line a tart plate with short pastry. Pour boiling water over the apricots and prunes; drain, and cover with cold water, and stand 3 hours. Remove stones from prunes, and cook with the apricots in the water in which they were soaked until the water is nearly cooked away. Cool, and add the other ingredients. Place on the pastry in the plate, cover with pastry, glaze, and bake 40 minutes.

Children also appreciate the following:—Mix equal parts of raisins, sultanas and currants, put through mincer, add a squeeze of lemon juice (a few nuts mixed is a great improvement); spread on bread and butter, or between home-made biscuits. Almost any fruit done this way is nice.

For a hot day a few prepared apricots placed in a 1lb. screw-top jam jar and a jelly made and poured over makes a very tempting lunch when there is one in the family who needs a little extra care and attention.

Apricot Jam

2lbs. dried apricots (best).
5lbs. sugar.
2 quarts water.

Soak apricots overnight; drain off water; add sugar to water, and boil. Put in the apricots, and boil until the whole jellies (about 20 or 30 minutes). A few blanched almonds are an improvement.

Apricot Butter, for Sponges, Fillings, Etc.

Take ¼lb. dried apricots (soaked); stew in a little water until tender, and pass through a sieve. When cold, add 1lb. sugar, ¼lb. butter, 4 well-beaten eggs, juice and rind of 1 lemon. Mix all together; put into a jar in a saucepan of hot water, bringing water to the boil. Stir one way until the consistency of thick cream.

Boiled Apricot Pudding.

Make a good suet crust, line a basin, and lay in ½lb. soaked apricots in layers, with sugar. Add a little of the juice, cover with paste, and boil 2 hours. Serve with custard or cream.

Prune Confection.

½lb. prunes.
½lb. icing sugar.
1 white of egg.
Grated nuts.

Soak prunes over-night; stone and cook carefully until tender; lift from syrup on to a dish to drain. Whisk white of egg until stiff, beat in icing sugar gradually until the mixture is like snow. Coat each prune. Cook in a cool oven until a pale biscuit colour. Place on a glass dish, and dust with grated nuts.

To Prepare Dried Fruit for the Table Without Cooking.

Place peaches in dish; sprinkle over 1 teaspoon bi-carbonate of soda, and pour sufficient boiling water over to cover. Allow to stand 1 hour. Pour off water and cover with fresh cold water and stand over-night. Skins will now come off easily. Lift fruit from water, and make syrup; use 4ozs. sugar to ¾ pint water, and use ¾ pint of syrup to every pound of fruit. Apricots and nectarines are prepared the same way as peaches, but it is not necessary to remove skins.

These are a few very simple ways of using the fruit, which I hope will be a help to those who should use dried fruits more extensively.

Miss E. Campbell, Dip. Dom. Econ., Inspector of Domestic Arts, Education Department, delivered an address, "Food Values."

AFTERNOON SESSION.

THE MEDICINE CHEST ON THE FARM

[MRS. F. G. HICKS, Clare.]

In every home, particularly those in the country usually miles from a doctor or chemist, a medicine chest should be regarded as a necessity. Many lives are no doubt saved and serious illnesses averted when there is at hand the correct drug or medicine to at least ease the patient until medical aid can be obtained.

The chest, of course, must be kept out of the reach of children, and if a special cabinet is provided for medicine, &c., that can be locked so much the better. However, nowadays, when we all study the most rigid economy, a special cupboard is out of the question; most people of necessity have a certain shelf or portion of a cabinet reserved for the storage of remedies.

As an outline I give a list of drugs that should find a place in every home. These may, of course, and generally are, added to; each housewife usually has some particular home remedy of her own. These drugs mentioned are not by any means expensive, and on occasions prove to be worth their weight in gold:—

Lysol.—Antiseptic and germicide, useful for washing all kinds of wounds, and as a lotion for skin troubles. Strength used should be 1 to 2 teaspoons in 1 pint of hot water.

Iodine.—Apply to all cuts and bruises, will also cure warts if painted on daily before the warts grow very large.

Camphorated Oil.—As a liniment for children.

Methylated Spirits.—An effective compress, will also cure septic fingernails. Keep a jar handy, and constantly dip the fingertips in it.

Chlorodyne.—Gives relief in cases of dystentery, colic, and stomach pains. Dose—2 to 8 drops in water every 3 hours.

Picric Acid, Carron Oil.—Both remedies for burns. Pour freely on lint or cotton wool, and apply to the affected area, bandaging firmly in place.

Kerosene.—Applied immediately to a burn or scald will relieve pain and prevent blistering.

Boracic Acid.—A healing agent used in water to bathe sores and wounds or applied dry.

Boracic Ointment is also good.

Olive Oil, Castor Oil, Glycerine, and Epsom Salts should also be included in every medicine chest.

I always keep a jar of *Antiphlogistine* on hand, and on several occasions it has proved invaluable. As an illustration I will quote an incident of a little child who was ill with what proved to be pneumonia, and some 10 miles from the doctor. As there was no telephone near and it was a cold, wintry day my jar of antiphlogistine was borrowed, and a poultice applied to the little sufferer. The result was that when the doctor was obtained the patient was on the mend. Nevertheless, in a case where pneumonia is feared I do not advise anyone to depend on home treatment as it is without dispute a time to call medical assistance. I have mentioned this to emphasise the advisability of having remedies on hand. They may be idle for years, but an occasion inevitably arrives when it is not convenient to journey miles for medicine.

I consider that each medicine chest should also contain a flask of brandy. In cases of fainting, collapse, and sunstroke it is invaluable, also in cases of accident, given neat or diluted with warm water. It will usually settle one's stomach in a severe bout of seasickness.

Home Remedies.

Boracic Ointment.—Eight parts vaseline, boracic acid 1 part. Mix thoroughly together.

A Good Liniment.—One part turpentine, 1 part eucalyptus oil, 2 parts camphorated oil.

Camphorated Oil.—One small cake of camphor crushed and added to a small bottle of olive oil. Shake well.

Embrocation for sprains, backache, lumbago, &c., can be made by mixing in a bottle equal parts of vinegar and turpentine and the white of an egg. Shake well before using.

Croup.—A quick and well-known remedy is made by mixing 1 dessertspoon of methylated spirits, 2 dessertspoons vinegar, and 3 of water. Dip a strip of flannel in this liquid and wrap around throat, covering with a dry strip. Will give instant relief.

A teaspoon of vinegar will usually give relief in the most violent attack of hiccoughs.

Glycerine added to a hot lemon drink in which is dissolved 2 or 3 aspirins gives great relief to a cold on the chest and to a sore throat.

A good gargle is made as follows:—2 tablespoons each of glycerine and tannin and peroxide of hydrogen, water 8ozs. Mix and use with equal parts of water three times a day.

It is well to try and avoid an accumulation of half-filled medicine bottles. When a mixture is discontinued throw it away. I refer to any individual prescriptions that one may have made up at different times. Keep a few clean empty bottles and small jars (vaseline jars, &c.) handy. They are useful for containing home-dispensed medicines.

Bandages.

I would also advise that a small cardboard box be kept in the medicine chest. This might contain bandages, finger-stalls, a small roll of cotton wool, sticking plaster, and lint. I never burn an old ragged handkerchief, but iron and put it away with the bandages. If ever so small it will make an effective soft pad to place over a wound before bandaging. Any clean white rags can be torn into strips and rolled into bandages of all widths and lengths. It is a convenience when some member of the family comes in with a cut finger or a gashed limb, to be able to place your hand on just the right sized bandage.

A pair of forceps and a small sharp pair of scissors should be included, as well as a clinical thermometer.

In conclusion, I would mention these few rules regarding the medicine chest. Keep all remedies together in a special drawer or cabinet in a handy place. Keep everything clean and neat. Label all bottles. *Keep poison in a different place to medicine as bottles are alike and mistakes do occur.*

When in doubt, do not experiment with home treatment. Unless you are sure of the nature of the ailment, a doctor should be consulted without delay.

HOME NURSING OF INFECTIOUS DISEASES.

[Mrs. S. L. Bailey, Belalie.]

The word "infection" is applied to the vehicle by which a disease is transmitted from one person to another by the air, and with or without actual contact.

Scarlet fever or scarlatina, mumps, measles, whooping-cough, and influenza, are infectious, and make up that class of disorders known as "catching." These

diseases are very often spread by children returning to school after an attack before they are quite free from infection. Parents should remember that it is only fair to other children that special care should be taken in this matter.

General Principles of Nursing.

The patient should be isolated in a room farthest removed from the rest of the family. The room should be first cleared of all curtains, carpets, and unnecessary furnitue, and then provided with a basin in which is a carbolic acid solution (1 teaspoon carbolic acid to 1 pint of water) provided for expectoration, a large bucket or tub containing carbolic acid solution (4ozs. of carbolic acid to every gallon of water) for soiled bed linen. This must never be taken dry from the room. Handkerchiefs should not be used, but pieces of old linen, which must be immediately burned, as the secretions from the nose and throat are particularly infectious. All cups, glasses, dishes, &c., must be boiled once a day.

In all cases the patient must be given complete rest, plenty of fluids, plenty of fresh air, and the bowels kept well open.

Scarlet Fever or Scarlatina.

Many people confuse these two names, and imagine scarlatina to be a milder form of scarlet fever. This is not so. Scarlatina is the latin name for scarlet fever. This is an acute infectious disease, attended by a scarlet rash upon the body, sore throat, and often swollen glands. The patient is put to bed in a well-ventilated room. He must be given frequent gargles (two hourly), and if the throat is very painful, hot foments every four hours or an antiphlogistine plaster applied around the neck. Plenty of fluids (chiefly water) must be given as kidney trouble is often a complication. The isolation period is six weeks, and during the last week a daily bath containing lysol or carbolic acid must be given.

Measles.

An acute disease. The patient appears to have a heavy cold, and whitish spots show inside the mouth. Give a hot bath, then put patient to bed. Give a purge, avoid draughts, place the bed so that the patient has his back to the light, and keep the blinds down. Give plenty of fluids until temperature is normal; then light, nourishing diet. Pay particular attention to the eyes. They must be swabbed with boric acid solution (1 teaspoon boracic to 1 pint warm water) twice daily. Great care must be taken that the patient does not take a chill, as pneumonia is likely to occur.

Whooping-cough.

This is a common infectious disease of childhood. In all cases it is best for the child to be kept in the house as soon as the malady has declared itself. In a very mild case it need not be kept in bed, but it should be in a room of warm and even temperature. Other children must be kept away. As vomiting frequently occurs after a bout of coughing, the child must be fed after each spasm.

There is very little that can be done for this most distressing complaint. It is advisable to call the doctor, as excellent results in shortening the duration and diminishing the severity of the attacks have been obtained by the injection of vaccine.

Mumps.

This is an infectious disease accompanied by the swelling of the salivary gland in front of and below the ear. If the pain is severe hot foments should be applied two-hourly, or an antiphlogistine plaster applied. Afterwards keep warm with a piece of flannel. The bowels must be kept open, and light, nourishing diet given.

INFLUENZA.

This disease has occurred in various countries at different times, and has a vast number of names. We are told that it first received its name "influenza" because it was attributed to the influence of the stars.

Treatment.—The first essentials are rest and warmth. This means bed, of course. There is no such thing as "braving it out" or "working it off," and if the patient attempts to do so the case is very much prolonged. Give a purge at the onset, and 1 dram of ammoniated quinine. Then 10 grains aspirin four-hourly is a help both in relieving the aching and reducing the temperature. Plenty of fluids, and light diet when the temperature is normal.

CHICKEN POX.

This is an infectious but harmless disease of childhood, attended by slight constitutional disturbance as a rule, and after running its course for a few days usually ends in complete recovery. Little red spots appear, and then within 24 hours each spot has become a blister surrounded by a red area. The child should be put to bed when the spots appear, and kept there for a few days. He must be prevented from scratching the spots by fingerless gloves. Plenty of fluids must be given. Then a simple, plain diet of milk and farinaceous foods. He must not be allowed to mix with other children until the scales have fallen off.

Here is a chart that might be useful to parents showing how soon after an attack of infectious disease a child may return to school without risk:—

Measles.—Three weeks after appearance of rash.

Whooping-cough.—Five weeks, or two weeks after "whoop" has disappeared.

Mumps.—Three weeks after swelling appears, or one week after swelling disappears.

Scarlet Fever.—Six weeks from appearance of rash.

Chicken Pox.—When every scab has fallen off.

FREE PARLIAMENT.

The following resolutions were carried:—

"That the Congress doors be locked during the reading of a paper or address, and only opened at the end of each paper or address."

"That the Government control the prices of groceries for State Bank clients, the same as is done for rations."

"That we ask for a flat rate to be instituted on the railways for all fruit and vegetables."

"That we ask for a bush box library to be available for Bureaux in outback districts, and that books on special subjects be made available to members on request."

"That the Education Department be asked to send doctors and dentists to small country schools."

"That the Welfare Department be requested to send the Baby Health Train on broad gauge lines in the outback districts."

"That the President of this Congress or a proxy be asked to give a wireless talk to members once a month on matters of interest to Branches, so that each Branch may be interested in the doings of other Branches."

CONFERENCE OF WOMEN'S BRANCHES AT PINNAROO.

THE WOMEN'S BUREAU.

[MRS. PEARCE, Parilla.]

The Women's Bureau to all appearances has come to stay. There are many reasons for its popularity, the chief being that its members are united in a common interest, irrespective of class or creed.

Each member has a desire to learn, and those who are in a position to teach do so in a spirit of comradeship and, as is the case in most things of a community nature, the members putting most into it get the most out of it.

One has only to read the reports of the Branch meetings in the *Journal of Agriculture* to realise what a wonderful scope of subjects are brought under discussion month by month. It almost seems impossible to think of something new, yet the work goes on and interest grows.

A large factor in the popularity of meetings are demonstrations. A number of busy housewives with an over abundance of tasks always at hand cannot sit down and study textbooks on subjects that interest them, but enjoy greatly meeting together, and when they can see things done in an atmosphere of relaxation with the social interest added they receive benefit in many ways.

As in all community organisations membership entails responsibility, and the successful Branch is the one with the greatest number of members working.

In these days of depression the Bureau makes a stronger appeal than when money is plentiful. The average housewife is eager to save, and her interest

1934 CALENDAR 1934

MAY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	●	30	31	..	..
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	●	28	29	30
...	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	...	...	...	...	...	...
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	●	27	28
29	30	31	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	●
26	27	28	29	30	31	...
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
●	24	25	26	27	28	29
30	...	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...		2	3	4	5	6
7		9	10	11	12	13
14	15	16	17	18	19	20
21	22	●	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	●	22	23	24
25	26	27	28	29	30	...
...	...	...	...	...	...	...

DECEMBER

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	●	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	..

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

is roused when she can learn how to make dishes of a tempting nature with very little cost, how to cut out and fit a garment creditably, and how to decorate her home.

Inter-branch visits are also very helpful to stimulate ideas, and the social side is strengthened thereby. The Annual Conferences bring in the expert touch, and much can be learned by those with eyes and ears to see and listen.

One realises in attending the local Agricultural Show and taking notice of the Bureau Exhibits, how much of the artist there is in numbers of the members. This also applies to cooking competitions. Powers that would otherwise lie dormant are brought out to please the eye and stimulate the brain of the observer.

The cultivation of flowers is also another phase of Bureau work, and nothing helps to make a home look more attractive than the addition of a garden.

To put it in a nutshell—the Women's Bureau is a means whereby its members may became educated in the practical, theoretical, social, and artistic sides of home life, and as such is recommended to all who are interested enough to consider joining its ranks.

SECRETS OF SUCCESSFUL SPONGECAKE MAKING.

[MRS. G. BECKMAN, Parilla Well.]

A sponge, if well made, should be one of the lightest and most deightful cakes. To be successful care must be taken in measuring the ingredients, mixing, and baking. The ingredients for a sponge—particularly the eggs—should be fresh and as cool as possible, and the mixing light and thorough. The beating of the eggs can be more effectively done if the whites and yolks are beaten separately, then mixed together, and the sugar added gradually while beating them. This method makes it possible to work up the sponge more quickly.

When adding the dry ingredients, great care should be taken to see that the mixture is neither over nor under mixed. Over mixing and the addition of too much flour makes the sponge tough. Under mixing gives the sponge an uneven texture, and it will possibly be sticky or sugary in appearance. A perfect sponge should not be full of "airholes." It should be fine and close in texture, and very light and spongy.

In baking, a very even, moderate heat is essential. Too slow cooking makes a sponge dry, too fast an oven will cook the sponge on top before it has a chance to rise properly. To test the oven for sponges, sprinkle a little flour on a tin or piece of white paper, and place in the oven in the position in which the sponge will be cooked. Leave it for five minutes. If it turns a golden brown in that time the oven is ready for use.

The even heat of a wood stove is very suitable for cooking sponges. To prepare tins for sponges grease well with butter, then sprinkle with a mixture of equal quantities of flour and castor sugar. Shake off any of the mixture that does not adhere to the tins. If the sponge tins are shallow it is advisable to put a collar of greasy paper around the tins. Prepared in this way the tins give a smooth and browned surface to the sponges.

RECIPES.

Light Sponge, No. 1.—Take 3 or 4 eggs, ¾ cup sugar, 1 cup flour, 4 tablespoons milk, 2 tablespoons butter, 1 teaspoon cream tartar, ½ teaspoon carb. soda. *Method.*—Beat eggs and sugar for 15 to 20 minutes, stir in cup of flour. Boil milk and butter, add cream tartar and soda, boil for 1 minute. Stir into eggs and sugar lightly and quickly. Pour into prepared sponge sandwich tins, and bake in a moderate over 15 to 20 minutes.

Cream Sandwich, No. 2.—4 eggs, 1 cup each sugar and flour, 1 teaspoon baking powder, pinch of salt, 4 tablespoons boiling water in which is dissolved 1 tablespoon butter. *Method.*—Beat whites and yolks separately for 10 minutes, then together for 10 minutes, add sugar, and beat until thick and frothy. Add flour

and baking powder, and lastly stir in boiling water and butter. Bake in sandwich tins for 10 to 15 minutes. Spread with raspberry jam and whipped cream.

Brown Sponge, No. 3.—4 eggs, ¾ cup sugar, 1 cup flour, ½ teaspoon carb. soda, 1 teaspoon cream tartar, 2 teaspoons cinnamon, 1 teaspoon each cocoa and butter, and ¼ cup milk. *Method.*—Beat eggs and sugar until thick and frothy, sift flour, cinnamon, cocoa, and rising together, stir in very lightly using a knife, then add boiling milk with butter melted in it. Bake 15 to 20 minutes in a moderate heat.

Cream Sponge, No. 4.—4 eggs, 1 scant cup sugar, 1 slightly rounded cup flour, 1½ tablespoons cornflour, 3 tablespoons hot water, 1 teaspoon cream tartar, ½ teaspoon carb. soda, 1 tablespoon each melted butter and cream. *Method.*—Separate whites and yolks of eggs, beat whites stiffly, beat yolks well, add whites, then beating vigourously add the sugar very gradually. Beat until thick and creamy. Dissolve soda in the hot water, and pour this down the side without stirring. Mix melted butter and cream, add without stirring. Sift flour, cornflour, and cream tartar, and with a tablespoon mix ingredients lightly together until completely blended. Pour in well-prepared sandwich tins, and bake in a moderate oven for 18 to 20 minutes. Turn out carefully on a sieve, and when cool put together with a suitable filling.

Swiss Roll, No. 5.—3 eggs, ¾ cup sugar, 1 cup flour, ½ teaspoon carb. soda, 1 teaspoon cream tartar, and 1 tablespoon cold water. *Method.*—Sift flour, soda, and cream tartar together. Beat eggs and sugar until thick and frothy. Add flour, stirring lightly, then add water and mix well. Put in a flat tin which has been lined with buttered paper. Bake in a moderate oven. or until when pressed with the finger no mark is left. Turn out on to a cloth sprinkled with castor sugar, roll up quickly, unroll, spread with warm jam, and roll up again. All sponges should be beaten at least 20 minutes to ensure success.

VARIETY OF SMALL MEAT DISHES.

[MRS. R. J. BILLING. Parilla Well.]

When preparing the midday or evening meal and a small dish as well as a joint of meat is required for the table, the following recipes will be found useful and very nice.

Beef Olives.—1½lbs. thinly sliced beef; lay on each slice a very thin slice of bacon. Prepare a seasoning of bread crumbs, thyme, rind of lemon, pepper, and salt. Put a little on each slice of beef, roll up, and tie with cotton. Place in saucepan, add a little onion, and cover with water. Simmer for 4 hours. Half an hour before serving take off cottons, and thicken stock. Put back to heat. Dish with toast around it. Add about a dozen olives if cared for.

Indian Curry.—Peel and slice 4 medium-sized onions. Brown in a pan with 2 tablespoons butter and 1 tablespoon dripping, stirring often. Then add ½ cup cocoanut which has been soaked in a little milk. Let brown, then add 1 cup milk, 3 teaspoons curry powder, pepper, and salt. Peel and halve about 5 hard-boiled eggs, lay them on the dish of curry, serve hot with plain boiled rice. Some meat cut into squares may be used in the place of eggs.

Luncheon Dish.—Cut 2lbs. steak into very thin slices, mix 1 cup of breadcrumbs with sago, salt, and pepper to season, 2 fair-sized onions sliced. Place a layer of meat in the bottom of dish, then a layer of finely-cut onions, and finally a layer of breadcrumbs and seasoning. Repeat this until dish is full, then pour over all 1 cup water, place on top a few slices of bacon, cover with a plate, and bake in a slow oven for 2½ hours. Any meats can be done in this way.

Brawn.—1 shin of beef, ½lb. bacon, 2 or 3 sheep's tongues, water, salt, and pepper. Wash and chop shin bone into pieces about 6in. long. Remove marrow from bone, and cut off bacon rind. Place shin, bacon rind, and sheep's tongues in a large saucepan, cover with cold water, and add salt and pepper. If liked, a bunch of herbs can be tied in muslin and added. Bring all to a boil, and simmer until gristle is tender and meat leaves the bones. Lift out, cut meat and

gristle into small pieces, skin and cut up tongues. Return to saucepan, keeping back the bones, rind, and herbs. Bring to boil, and cook for a short time to reduce the liquid if necessary. Pour into moulds or basins, and allow to set firmly. Remove any fat from top of mould, turn out, and garnish with parsley. If a pig's cheek is used with the other ingredients it is an improvement.

Meat Paste.—1lb. beef with a little fat. Cut into large pieces, and steam in a jar or basin for 3 hours. Put through mincer 3 times, add gravy, 1½ teaspoons each grated nutmeg and pepper, and 2 teaspoons salt. Mix well together and put in small jars.

Steak and Apples.—2lbs. steak, 4 apples, ½ cup breadcrumbs, 1 tablespoon melted butter. Peel and slice apples, make some cuts in steak with a sharp knife to keep apples in place. Season with pepper and salt. Roll up and tie to keep all together. Brush all over with melted butter, and roll in breadcrumbs. Put into a greased paper bag, and bake 1½ to 2 hours in a moderate oven. Serve with brown gravy.

Stuffed Loin of Mutton.—Remove the bones from a loin of mutton, then beat the meat and trim neatly. Lay any good trimmings in the centre of the piece, and season well with pepper and salt. Prepare some veal stuffing, and place it in the meat where the bone was removed. Roll up and tie securely. Bake in the usual way, and serve with gravy. A green vegetable or tomatoes and baked or mashed potatoes can be served with meat.

THE HOME GARDEN.

[MRS. G. PEARCE, Pinnaroo.]

There is nothing that adds so much to the attactiveness of a home as does a garden of gay flowers and shrubs. The fences used as breakwinds—so necessary in open spaces—may be made beautiful with creepers and twining plants.

This is quite a simple matter when a good supply of water is laid on to the garden, but the flower lover whose home is in a low rainfall area, and with water either unsuitable for a garden or too far away, is often discouraged by her first attempt to make a garden and grow her favourite flowers. Still it is possible for almost everyone to have a few flowers during the greater part of the year if care is taken to choose those which need least water. Of course, every drop of usable water must be saved. Even the soapiest water can be utilised if a trench about 9in. to 12in. is dug beside the row of plants, filled almost full with charcoal and coarse sand, and the water poured into this.

A row of chrysanthemums do quite well with this treatment. If two rows of chysanthemums are planted about 18in. apart and during September or October a few seeds of cosmos and miniature sunflowers are planted between the rows, they will flower before the chrysanthemums. Snapdragons, calendula, linaria, larkspur, stocks, and wallflowers are all easily grown, and will stand dry conditions better than most flowers. Never allow any flower to go to seed, unless you wish to keep the seed, and the plants will flower longer. The calendulas will supply winter blooms if planted early. Marguerites are hardy; they bloom for a long period, and are well worth growing if space and water are sufficient.

It is surprising how much can be grown in a 12ft. square. Plant fairly close and give a light mulch. If it is desired to grow a few less hardy flowers, plant the seedlings in tins and bury these near a taller plant. In this way they may be given special care, and yet not robbed by the stronger plants. Cold tea is splendid for watering these favourites.

Geraniums make a bright show, and are good subjects for the gardener who has little time to spare. I prefer them, however, as outdoor pot plants in any shady place.

Daffodils and freesias are the best bulbs. They need not be taken up every year. In fact, they do better if left undisturbed, and are not at all harmed by being watered while dormant. Exhibition blooms cannot be expected by these methods, but we should seldom be without a few flowers for our homes.

WHAT IS THERE TO BE GAINED FROM THE ANNUAL AGRICULTURAL BUREAU CONGRESS?

[Mrs. E. J. Sands, Pinnaroo.]

I have been trying for some years now to ascertain from which source we get the greatest benefit—if from our own papers with the discussions of our own members who live in the same districts, work with the same material under the same conditions and who experience the same difficulties, or do we derive the greatest amount of knowledge from professional speakers who give us the results of years of experience, who work in different districts, under totally different conditions, and who have the experiences of professional experimenting in other States in addition to their own home districts?

We have all the experiments and practical experience and the worked-out theory. We gain quite a lot of good knowledge from Mrs. Brown's paper on cooking, how to cure a pig, and how to manage the home, dairy, poultry run, make jams and preserve fruit, home dressmaking, home nursing, and many other subjects needful in everyday life, but it appears that all of these subjects, handled by the amateur, lack such a lot of knowledge that is really essential to the subject if it is to be the success it undoubtedly should be. Therefore, take hold of every advantage, each moment of time, lectures, practical demonstrations arranged by the Agricultural Congress—such as Farmers' Union factory, with its butter, cheese, egg, egg pulp, milk and bacon departments which gives more help in a few minutes than can be gained by papers; the visits to Faulding's, Roseworthy, Waite Research Institute, Unley Central School, Better-farming Train, Babies' Health Centre, which all give practical demonstrations and make our job very much easier to go back to.

Let us look at what can be learned from lectures by professional speakers such as Miss Campbell, Mrs. Dolling on "New Zealand," Mrs. Morriss on "Education," and "Speargrass" on "Gardening." Doctor Halley gave us the professional side of "Home Nursing," and Dr. Constance Davey spoke on different types of children and how other countries are dealing with them.

Compared with these professionals, our papers lack the theory of all these subjects, and no one can work on any job, be he professional or labourer, business man or otherwise, unless he or she has the proper theory to start on.

Country conferences do more than words of mine can tell for each district. I hope all will try and attend the Agricultural Congress, and I hope to see the time when those women who go from each branch to represent its members will attend each session and carefully take notice of all that is to be learned from the papers read and bring it back to the home branch. It seems a pity that a different member cannot be sent each year. Those that have never been to a Congress have certainly missed a great opportunity. The visit paid to the Unley Central School was an eye-opener which Bureau members will never forget. It would take too long to describe all that was seen there.

My opinion is certainly definite on the subject that we gain very much more from the Agricultural Congress by giving our whole attention to the programme set down by professional men and women than by reading our own papers that can be done at our own monthly meetings. There we can use the saying, "Discussion is the life of the Bureau," and discuss subjects to their fullest, and after the discussion we will still need a professional to put us on the right track.

We cannot value too highly the ability of Mrs. Hammatt who has presided for so many years. She has always given willingly of her experience as a housekeeper. She never absents herself from a meeting, and is always so good at helping others.

CARE OF THE HOME.

[Mrs W. Threadgold, Parrakie.]

There are many methods of taking care of the home, and these may be very varied. Take for instance the town housewife, who has only her home to think of;

then there is the farm houswife who has to do numerous tasks outside before she can give any attention to housework.

The main thing about a home is to have the rooms built as conveniently as possible, and to have water laid on to the kitchen, washhouse, and bathroom. The work can be done more quickly, and one does not feel so tired as they would if the water had to be carried. I always try to start the week by doing the washing and ironing, and have the middle of the week free for gardening, sewing, &c. Where there is only one woman to do all the work it is a good plan to clean rooms that are not in constant use in the middle of the week. That is easier than having all the cleaning to do at the week end when there is extra cooking and numerous other duties to do.

When spring cleaning I do one room thoroughly each day, and choose a week before the busy season if possible. When there are a number of windows to clean do a few at a time. When washing blankets, doing one or two on washing day is not so strenuous as doing them all in one day. A separate case on mattresses saves a lot of work and time; these are easier to take off and wash than having to empty and refill the mattress.

Kerosene is useful in many ways for household duties; a little added to the water when washing linoleum helps to give it a polish and also preserves it. In homes where there are small children and there is danger of them falling on slippery floors, instead of polishing rub over the floors with a cloth to which a little kerosene has been applied. Another suggestion is to mix 2 cups of kerosene and 1 cup of linseed oil, shake both together, and apply to the floor with a cloth or mop. A few drops of kerosene added to the copper when boiling clothes will help to whiten them. Windows and mirrors can be cleaned very easily with Bon Ami rubbed on with a damp cloth and when dry rubbed off. Spraying rooms with Fly-tox and closing them for a while helps to keep moths and silverfish away. Spray skirting boards well and all corners; also wardrobes, drawers, and cupboards. Petrol sprayed inside of instruments will help to keep moths out of them.

Blowflies are another pest, especially in springtime. If a wire screen is made and put on top of the chimneys it will keep quite a lot out of the rooms. Chimneys can be cleaned by pulling a pine branch up and down. A good way to remove finger marks from furniture is to sprinkle a few drops of mop oil on a damp cloth and polish with a chamois.

The kitchen is the main room in the home as a woman spends most of her time there, so have it as bright as possible. I prefer a fair-sized room with white walls. In the evening if the ashes are cleaned out of the stove, the fire set, and the table set ready for breakfast, it is a good help in the mornings, and the menfolk are not delayed in getting to work.

The best method of arranging the home is to have the meals at regular hours and plan a certain amount of work for each day. The outside appearance of a home should receive just as much thought as the inside. Shrubs, bright flowers, and a few pot plants all help to make the surroundings attractive, not to mention fruit trees and the ever-profitable vegetable garden.

THE PLACE OF HUMOUR ON A MALLEE FARM.

[Mrs. Herbert, Parrakie.]

Before coming on to a farm in the mallee, if I had believed reports given by those who had had unhappy experiences, I should have doubted if there could be such a thing about it as humour. Like an old lady at the zoo, on first seeing the giraffe and looking up its long neck to its funny little head, she solemnly declared, "There aint any such animal." However, we do know that even when things are difficult there is still a place for humour, and if we did not believe it probably we should not have come.

Humour is a mental quality something like wit, but depends for its effect rather on kindly human feeling than on brilliancy of expression. It is a quality that

gives to ideas a ludicrous or absurd turn. We know it probably among members of our own families. But not all have it, for in that form it is a gift. But add "good" to it—"good humour"—and all can have it, for it means cheerfulness and a happy temper.

I do not see any place for humour at the expense of other people's feelings. This may be wit, not humour. There is no place for fun about physical failings or peculiarities on which they are probably sensitive. There is no place for humour about the facts of life, especially before our little folk. No repeating of youthful questions, especially in their hearing, about the beginnings of their own life. That is a something for you to answer them as wisely as you may—a secret between you and them, and to have told them before the vulgar world gets hold of them.

Now what would life miss on a farm or anywhere else if we had not our jolly people that can turn a laugh in a bad time. Charles Dickens and his Mark Tapley who thought it no credit at all to be lively and gay when things were bright. But when Martin Chuzzlewit got to America and bought a farm from a city plan and went out there with Mark and found it a fever-stricken swamp with neighbours ill or dispirited, he began to shine brightly. He was up against something, and now was the time to be jolly. But he *acted* the jolly part, too, and helped one and all.

We cannot all say funny things or shrug our shoulders in a funny way, or make a funny face, and such folks are a gift to our sometimes rather drab old world. I remember reading, "Some folks make more friends coming into a room than others do so by long and faithful service." It is so, and quite often the popular ones are the ones who can do something humorous.

On a farm there are special times that call for a display of good temper—when the cow kicks over the bucket of milk, when the horses get out of the yard by pushing down a weak post, when other people's animals like the look of your wheat or oats—best of all, when the animals get sick, when we want to do a job that is past our strength and have to see someone else—so kindly to the rescue—doing it *not* as we would. When the flies come in millions and get into all the food and will not leave our arms and faces alone—these and many others are times that need a bit of good humour to help us over.

I believe singing and even whistling is a good help. It encourages cheerfulness, and heartens others. Perhaps you say it is not very sweet music. Well, there are lots of birds, and all are not nightingales. Even the crow and the sparrow join the chorus, though I confess we must forget for a moment the designs they have on the lambs and the wheat.

There are times probably when all feel low spirited, and perhaps our Bureau may, with its sociability, help a little, for we are rather lonely and very busy women, and cannot often meet. But a merry heart doeth good like a medicine, and if it is not in our power to make others laugh at troubles or difficult situations perhaps a laughing, good-humoured spirit may radiate through our own lives, and give us the glow to halve the troubles and double the joys of life on a mallee farm.

CONFERENCE OF UPPER NORTH WOMEN'S BRANCHES.

Mrs. M. B. Genders presided over an excellent attendance of delegates from the Nelshaby, Belalie, Morchard, Wepowie, Willowie, and Wilmington Branches. Ladies were also present from Port Pirie, Jamestown, Tanunda, Murraytown, and Hammond.

Miss E. Campbell of the Education Department addressed the delegates on "Food Values," and the following papers were read and discussed:—

NEEDLEWORK.

[Mrs. E. L. ORCHARD, Belalie Women's Branch.]

Do we ever think, when we sit outside on a sunny afternoon or by the fire on a dull one to do our mending or knitting, that our work basket and everything in it has a history, some of it very interesting. Even the humble but useful pin has evolved from something quite different from what we use every day and has been manufactured in England since the Sixteenth Century. Pins made of bone were used

by savage races, bronze pins have been found among the relics of the later stone age, and until the end of the Fifteenth Century, women used skewers to keep their clothes together. The term "pin money" originated from the custom of people giving gifts of a collection of pins or the equivalent in money. A pin of bronze, very slender and bent in such a manner that its point is caught against the head, has been found, which makes collectors think that the safety pin or its ancestors originated in Central Europe about the year 1000 B.C. Modifications of this type of pin apparently used as we now use brooches for decoration, were found among the possessions of the people of early Europe.

Embroidery—obviously achieved with needle and thread—is to be seen on ancient Egyptian garments, and iron needles have been found in Egypt and Rome, but other than that the origin of needles is lost in antiquity. We read delightful passages which deal with spinning or needle craft in many of our most valued books, and they often throw light upon a character or situation which is more illuminating than many lines of descriptive matter. English writers of the past generation, speaking of the most essentially and beautifully feminine of crafts, always do so in connection with the needle and the fingers. About the year 1500 needlework exhibited showed that Biblical subjects were more usually chosen than any others in all types of embroidery; for instance, the whole story of the Flight into Egypt is told by needle-pictures on old tapestry wall hangings.

Needlework is an all-absorbing subject, be it mending of working clothes or the creation of some exquisite ornamentation or garment. Ruskin places needlework first of the six queenly and muse taught arts, the others being writing, pottery, sculpture, architecture, and painting.

Morality may sound a big word to use in connection with such a homely, every day experience as needlework, and yet in our grandmothers' days careless, slovenly sewing was considered a disgrace of the most serious kind, and it is certainly an unfailing index of unlovely qualities. Directly one begins to use a needle, a regular character-chart is started upon, and the very first indication that appears is the degree of patience possessed by the worker, and there is no need of an elaborate piece of work to test this quality. The sewing on of a button or a mended tear is sufficient. I wonder how many of us feel sometimes there really is not time to do an insignificant bit of mending properly, and proceed to "cobble up" the tear with any cotton that is near at hand or catch the button to the coat with half a dozen hasty stitches. And all through there is the uneasy sense of guilt, as if one has quite consciously offended against the standard of refinement. On the other hand, what a delightful sense of peace and satisfaction in right-doing comes when the temptation to be in a hurry has been resisted and the threads of matching material have been carefully unravelled, a fine needle chosen, and an almost invisible darn accomplished.

The homely craft of needlework becomes an accessory in our individual development, and after all, impatience and laziness are handicaps in every walk of life; so, too, is contentment with work of an inferior standard, work which is poor and hasty and that which, if we cared to take the time, we could improve. The great thing in needlework is to feel we can express our own ideas in the stitchery that is not all darning or mending. Even a tree or bird crudely drawn to decorate a child's overall, if our own idea, is a step in the right direction to creating something that no one else has exactly like it. There are so many purposes to which one's knowledge may be applied, and the plainest piece of work can become a thing of beauty if the stitching is good and the embroidery evenly done.

Many people like to make presents of their handiwork when birthdays come around, and how much more is the work appreciated when the time and thought of a friend have been lovingly spent upon it. A present should be a luxury, a little extra that will add to the pleasure of life, a gift beautiful to look upon, but useful. Embroidery is the decoration of the useful, a gay touch of colour turning everyday articles into treasures of art. In hand-needleworked gifts, the chief cost is labour, and therefore the willing giver can be more ambitious. The machine-made article, however perfectly

finished, does not satisfy the craving for the personal touch or the desire that the gift should be made exclusively for the recipient.

Attention to detail is always important, and good tools are as necessary as good work, and particularly the needles should be the correct size for the threads in use; if the eye is too small, a frayed thread results, and if too large a hole is left in the work that is sometimes hard to fill. Scissors should be sharp and of a size suitable for the material in use. It would take many hours to describe in detail all the types of needlework that are used at the present time, but amongst the most popular are tapestry and knitting. One of the greatest revivals in the history of embroidery is the present vogue for tapestry on canvas, that beautiful art which was practised in England as far back as the Fourteenth Century, and has such an appeal to the busy, modern woman who finds it a soothing and fascinating relaxation for the precious leisure hours. We are living in an age of expression, and tapestry has an atmosphere of romance about it that makes it welcome in any home, old or new. Cushions, chair seats or backs, a fire screen, footstool or a handbag can give the maker of needleworked tapestry, who would express her own personality, scope and possibilities second to none.

For those who prefer it, knitting can fill all available spare minutes in the day, and in this, as in other needlework, attention should be paid to the sizes of needles used with particular threads and according to the garment to be made. For instance, baby clothes should be worked more loosely than other articles, because naturally they are laundered more frequently and will eventually shrink with continual washing. These hints about knitting needles may be useful: For looser knitting bone needles are best; when a flaw does appear it should be smoothed with glass paper and the points should never be too sharp; for heavy, large garments, enamel coated steel or aluminium needles do not bend as do those made of celluloid.

All women should learn to knit. Many beautiful articles as well as useful ones can be made with knitting needles, and it does not require such good eyesight as fine embroidery or crochet work. Some women can knit and read at the same time; knitting is a restful occupation for the tired housewife, a great boon for restless hands and tired brains, and for old ladies who can no longer see to make the delicate stitches in other needlework.

Every mother should consider it her duty to teach her daughter to knit; if she does not make use of the accomplishment in her younger days it will be a great comfort in old age. For what is more pitiful to see than an old lady sitting through the long winter evenings with nothing at all to do? Plain needlework is the first essential to learn; besides its practical value, it teaches neatness and accuracy.

For the sake of one's health, it is important never to sit in a stooping position; always sit so that the light comes over the shoulder, and avoid working on dark materials in an artificial light.

The art known as needlework can be summed up as a knowledge of how to make the best use of needle and thread.

INFANT'S LAYETTE.

[By SISTER GURRY, Belalie.]

The layette described is within the means of most mothers and comprises all the essentials. Mothers may, of course, add additional garments, according to their means.

Clothing needed for new babe:—4 gowns or frocks, 3 or 4 petticoats, 3 singlets, 3 binders, 2 or 3 dozen napkins, 2 pairs bootees, 2 coatees, bunny rug, &c. The amount of baby's clothing should be regulated by the weather, remember to clothe baby according to the temperature of the day.

Materials used for baby clothes should be both for health and economy. The essentials to remember about all baby clothing are:—

1. To see that the garments are light, warm, and non-irritating.
2. To provide for warmth and air without undue weight or multiplicity of garments.
3. To see that they are made in such a way as to ensure easy washing, drying, and ironing.

4. Have no constricting bands which hamper development.
5. Have no undue double thickness of material, which is difficult to dry quickly.

A young baby does not possess the ability to regulate its own body heat, therefore his temperature varies according to the surrounding atmosphere. Cold air will not injure baby provided he be suitably clothed. Clothing should be light and warm, and if possible, suspended from the shoulder—the best a mother can afford. Flannelette is most unsuitable; it is too heavy and is inflammable. Most babies, however, suffer much more from being overclothed than underclothed, and a very great exception is the feet. It is surprising how often a baby's feet and legs are uncovered even in cold weather and allowed to become chilled, therefore it is most necessary that young babies should wear bootees. A good rule is: In winter keep the baby warm, but not hot; in summer keep him cool, but not cold. The signs of overclothing are excessive heat, restlessness, and irritation of the skin, which sometimes leads to prickly heat or eczema, it may also cause diarrhoea. So much clothing prevents freedom of movement for the limbs—baby cannot have enough active exercise from kicking if overclad and this may give rise to constipation. Baby's clothing should not be tight around any part of the body.

The Binder should consist of light flannel, 4in. to 6in. in width and about ¾yd. to 1yd. in length. This should not be wrapped around baby too tightly and should be held in position with a few stitches or 3 small safety pins. The binder is frequently left on for some considerable time after it has served its purpose; this is a mistake, it prevents the muscles of the back and abdomen from developing properly and so hampers deep breathing. Baby should be allowed to develop normally and naturally, and for this reason the binder should be discarded as soon as the dressings on the cord are no longer necessary.

The Vest may be made of silk and wool or soft baby wool, so that it will not irritate the soft skin of baby. A wide piece of tape should be stitched on the front of the vest so that the napkin can be pinned to it, thus preventing any space between the vest and napkin.

The Napkin should be made of soft swan skin or good flannelette, and care should be taken when putting on the napkin, it should not be drawn too tightly or made bulky between the legs, this causes discomfort, deformity such as bandiness, and contraction of the pelvis. A sufficient number should be supplied so that clean and dry ones are always at hand; they must always be changed when wet. Never re-dry and use again. Do not use soda or blue for washing. Attention to these details will largely prevent chafing. Never put rubber pants on a baby, they are most injurious to its tender skin as well as its general health. A pair of pilchers, knitted, should be worn outside when baby is being carried; a very suitable napkin protector can be made from double flannel.

The Petticoat should be made of loosely woven flannel or same material as frock, make same length as frock, or in other words, long enough to cover the feet—they can always be shortened later. Allow 1¾yd. of 30in. material for each petticoat.

The Frock should be made same length as petticoat, of soft material—radianta, viyella, winceys, &c. Light knitted frocks are useful for colder weather. Allow 1¼-1½yd. of 30in. material for each frock.

The Coatee.—Use any materials suggested for frock—flannel or knitted ones.

The Nightgown.—Any soft material, cheap flannel, wincy or viyella; make long, as pattern. Take 1¾yds. of 30in. material for each nightgown.

The Bootees.—These can be made of scraps left over from frocks, &c., or may be knitted. Baby's feet must always be kept warm. Mothers are reminded that it is seldom necessary to make the full number of bootees, bibs, bonnets, &c., as these garments are often given to baby as presents.

The Bonnet should only be worn when the baby is outside on cold or windy days.

Shawls.—One large shawl for outdoor use should be provided, also two smaller ones or bunny rug or blanket for use when lifting baby from his cot and taking him from one room to another.

Bibs.—Seldom used, but very often handy. They can be made from scraps.

SOAPMAKING.

[Mrs. C. A. Brown, Eurelia.]

Soap should be boiled in order to obtain the best results. Soap made by the cold method does not lather satisfactorily, and it is very harsh on the hands. The method indicated below yields a soap of good colour and even texture.

Save the fat skimmed from the corned beef water, soups, stews, and that which is of no further use for frying, &c. During the cooler weather all fatty trimmings from cooked or uncooked meats may be put into an old cake tin, and when the oven is hot for baking it can be rendered down without extra expense. When making this soap no more than the quantity indicated should be made in a kerosene tin at one time, because it boils over very readily. Care must be exercised in the handling of the caustic soda as it is a powerful corrosive.

Put all the fat into a vessel (unless it is quite clean and strained), and melt it with a quart of water. Strain through a coarse cloth, it is more effective than a colander. Allow to become hard, and the dirt and salt and much discolouration will be found in the water. Lift the fat, scrape off the layer of dirt, and weigh it.

To Make Soap.

Put 1lb. caustic soda into a kerosene tin and add 6 quarts of water. Avoid getting the dust or fumes into the nostrils or lungs. Add ½lb. resin, 1 packet lux, 1 tablespoon borax, and 7lbs. fat, carefully. Bring to a boil and be very careful it does not boil over. Stir occasionally. Allow to boil slowly for 2 hours. Remove from fire, stir in 1 teaspoon of citronella and leave in the tin overnight, or pour int a box lined with wet calico. Turn out next day and leave to dry for a week or two before cutting into bars. It will be ready for use in about a month, though the drier the more economical it will be. If preferred, all dry ingredients may be put into the tin first and the water poured over them. The better plan is to let it stand all night before making and it is less likely to boil over.

A Tested Recipe.

Put 1lb. resin and ¼lb. borax in a copper with 11 pints of hot water. Boil until the resin is soft and stringy. Melt 6lbs. of fat and pour into the copper. Dissolve 1lb. caustic soda with 3 pints of warm water. Use a large tin or enamel vessel for this purpose. While it is bubbling pour into the mixture in the copper, stirring all together. Add ½ cup of liquid ammonia and ½ packet of lux flakes. Boil for 5 minutes, then pour into moulds or leave in the copper to set. The soap is of a white colour when first made. Leave it stand to dry for a month before using. It will then be of a pale yellow colour.

Papers from Nelshaby Women's Branch.

WOOL.

There are many ways of using the woollen coat from the sheep's back. In these days of depression and hard times it behoves every one to make money go as far as possible. Of course, this year wool is much dearer than it was last year. This year knitted garments are very fashionable, and as well as being warm, they can be very smart. Jumpers, caps, coats, gloves, scarves, bags, pullovers, dresses, and quite a number of articles are knitted in dozens of different shades and designs.

Jumpers, for instance, can have cowl fronts, fancy collars, puff sleeves, long sleeves, short cuffs, long cuffs, elbow puffs, leg of mutton sleeves, wing sleeves, in fact, the same type of sleeve as a frock. Jumpers are either short or long with a belt. Raglan sleeves make a well fitting jumper. Caps are made in colours to match jumpers, some are straight with peaks at the top, some drawn down over the right eye, some shaped at the top. Coats ar made in a variety of styles—long swagger coats, short coats, coats with belts, raglan sleeves, cardigans with and without collars. Caps, scarves, gloves, and bags knitted in the same colour and design make very nice sets.

Evening capes can be knitted with wool (2-ply) in a plain or fancy stitch. Bridge coats are very easily knitted. All these garments are very cheaply made. Pullovers,

socks, scarves, and gloves are made for men, and for the babies practically everything that they wear.

Babies' clothes should be knitted in either babies' wool or 2-ply wool, and done on a fairly large needle (say size 9). If they are knitted too finely they shrink more easily than garments knitted loosely. For bigger children whose clothes have to be tubbed a lot, a cheap wool is best, it does not shrink so much.

Men's pullovers and cardigans look better if knitted in a 4-ply wool. When knitting a garment, it is best to use your own directions because what will fit one person may not fit another when knitted. Very few people knit alike. Some people say, "Oh, yes, these directions will fit me, I'll just use a larger size needle." Of course, when the garment is finished, it may fit the person it was intended for, but look how loose the tension is, and the smartness is gone.

Size 10 needle is the best to use for 4-ply wool, size 11 needle for 3-ply wool, and size 12 needle for 2-ply plain knittings. If you are a tight knitter, use a size larger needle; if a loose knitter use a size smaller. For 2-ply lacy stitch jumper, size 10.

If you do not know how many stitches to cast on for a jumper, cast on about 30 stitches, and knit 1 row and purl 1 row for about 2in. Then measure the number of stitches to the inch. If the tension is 10 stitches to the inch and you want to knit a piece 10in. wide, you will want 100 stitches. When shaping a jumper do not guess the size but take the bust, chest, length of jumper from neck and armhole, and length of sleeves. On no account stretch knitting to the desired shape. When knitting a jumper or any garment always knit the back first. It is safest to commence sleeves from the top. If knitting a jumper to the throat make the front neck 1½in. lower than the back. Always be careful when putting a jumper together, sew all straight seams by hand. Sew shoulder seams by machine and sew sleeves in by machine. If a striped jumper, see that each stripe meets.

For the bottom of jumpers, always cast on with the thumb and 1 needle. Do not knit into the back of the stitches. If knitting a hem, knit on the stitches with 2 needles, do not knit into the back of the stitches. When you have knitted twice the depth of the hem, as you knit pick up a stitch from the first row. For button holes, cast off, say, 4 stitches, in the next row cast on 4 stitches, in the next row knit into the back of 6 stitches. Always count the cast on stitches as a plain row.

If you have old jumpers that are finished, unpick them, knit into squares about 4in. square, or any odd balls of wool, any colours will do. Join together after the fashion of a patch-work quilt. Knit these squares with double wool. Cosy blankets for baby or even for larger beds can be made in this way. Last winter I made a blanket for a three-quarter bed, all knitted with double wool.

RECIPES.

[Miss De Silver.]

Iced Currant Fingers.—¼lb. butter, ½ teaspoon baking powder, 2ozs. sugar, 1 egg, ½lb. flour, 1 tablespoon milk, salt, 2-4ozs. currants. *Method*: Sift flour and rising, rub in butter, add sugar and currants. Mix egg yolk and milk together, and stir in flour to make all in one lump. Roll out thin, beat egg white well, stir in 4ozs. sifted icing sugar gradually. Spread thinly over surface of biscuit, cut in fingers and bake in moderate oven 20 minutes (400°).

Short Bread Creams.—3 eggs, ½lb. butter, ½lb. sugar, 1lb. S.R. flour. *Method*: Cream butter and sugar, add beaten egg, then flour. Roll out, cut into rounds. Icing: Mix icing sugar with a little lemon juice and melted butter, put between two biscuits.

[Mrs. Noble.]

Wholemeal Crisps.—1 cup sugar, 1 cup butter or cream, 1½ cups of wholemeal, 1 cup flour, 2 teaspoons of cream tartar, 1 teaspoon carbonate soda, enough milk to mix; roll and cut in shapes (moderate oven).

Currant Fingers, Iced.—¼lb. butter, 2ozs. sugar, ½lb. flour, pinch salt, ½ teaspoon baking powder, 1 egg, 1 tablespoon milk, 2ozs. to 4ozs. currants. Sift flour and rising, rub in butter, add sugar and currants, mix egg yolk and milk together, and stir into

flour to make all in one lump, roll out thin. Beat the egg white well and stir in 4ozs. of icing sugar, spread thinly over the surface of the biscuits, cut in finger lengths, and bake in oven about 20 minutes (400°).

Stuffed Monkeys.—Paste: 2 cups flour, little salt, 2 level teaspoons cream tartar, 1 level teaspoon soda, 3ozs. butter, 2 tablespoons sugar, 1 egg. Sift flour with rising, rub in butter. add sugar and mix into a stiff paste with well beaten egg, roll out about ¼in. and cut into 3in. squares. *Mixture*: Chop up 1 cup seeded raisins, 1 tablespoon mixed peel, 1 tablespoon sugar, ½ cup sultanas, 1 teaspoon ground cinnamon. Mix all together and put 1 dessertspoon in each square of paste, fold over and press edges together, brush with milk and dust a little sugar over, bake until golden brown (400°).

BISCUIT RECIPES.

[Miss FRANKS.]

Cocochews.—Beat 2 egg whites until stiff, add ½ teaspoon salt and 1 cup sugar a little at a time. Mix with 2 cups corn flakes, 1 cup cocoanut, and ½ teaspoon of vanilla. Bake in a moderate oven for 10 minutes.

Cocoanut Rocks.—2ozs. each corn flour, sugar, flour, butter, and desiccated cocoanut, 1 egg, 1 teaspoon baking powder. Cream butter and sugar, add beaten egg, then dry ingredients.

Rosala Biscuits.—2 cups S.R. flour, ½ cup sugar, ¼lb. butter, 1 egg and yellow of another. Mix dry ingredients, then make stiff with egg and a little milk if needed. Roll out, spread with following mixture. Beat an egg white stiff, add enough icing sugar to make f a, cut into fingers and sprinkle with cocoanut.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Pinnaroo	6/7/34	18	"Dried Fruit," Mrs. H. Harding	Mrs. F. Atze
Snowtown......	2/8/34	34	"Buttermaking," Mrs. A. Hocking	Mrs. A. Hocking
Wilmington	9/8/34	13	"Use of Lamb," Mrs. Wright "First Aid," Sister Milne	Mrs. L. Cole
Belalie	14/8/34	14	"Honey," Mrs. A. Sandercock	Mrs. E. Orchard
Mangalo	8/8/34	16	"Thrift," Mrs. O. Guy...	Mrs. B. Coles
Coonawarra	15/8/34	14	"Recipes and Hints" ...	Mrs. F. Skinner
Kangarilla	16/8/34	8	"Citrus Fruit"	Mrs. M. Steer
Morchard	22/8/34	20	"General Health," Mrs. Stainer	Mrs. C. Schutz
Hope Forest and Dingabledinga	2/8/34	22	"Breadmaking," Mrs. Manning	Mrs. L. Fincher
Warramboo	31/8/34	12	"Soapmaking," Mrs. L. Adams	Mrs. A. Steer
Rendelsham ...	5/9/34	9	"Sconemaking," Mrs. Foster	Mrs. Z. Bignell
Williamstown ..	5/9/34	6	"Pot Plants," Mrs. Coleman	Mrs. A. Cundy
Clare	1/9/34	31	"Pot Plants," Mrs. T. French	Mrs. A. Pollock
Penola	5/9/34	58	"Rugmaking," Mrs. F. Lynn	Mrs. E. Kidman
Laura Bay	11/9/34	14	"Cake Recipes," Miss Spry	Mrs. R. Burke
Monarto South	18/8/34	10	"Ironing," Miss Cottrell .	Mrs. F. Liebelt
Monarto South..	15/9/34	15	"Biscuit Making," Mrs. H. White	Mrs. F. Liebelt
Warcowie	18/9/34	7	"Home Renovations," Mesdames Sanders and Crossman	Mrs. A. Crossman
Wilmington	13/9/34	56	"Rug Making," Mrs. Orchard	Mrs. L. Cole

Other Reports Received.—continued.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Auburn	28/9/34	20	" Chicken Raising," Mrs. S. Stephens	Miss L. Dennison
Coonawarra	19/9/34	22	" Gardening Notes," Mrs. Reschke " Breakfast Dishes," Mrs. Mitchell	Mrs. F. Skinner
Balumbah......	26/9/34	6	Discussion	Miss H. Jericho
Saddleworth ...	2/10/34	17	" Wool Spinning," Mrs. W. Johnston	Miss G. Frost
Belalie	11/9/34	16	Address—Mr. McCarthy .	Mrs. E. Orchard
Parrakie	2/10/34	12	" Afternoon Teas," Mrs. Herbert " Lunches," Mrs. Temby	Miss J. Halliday
Sheoak Log	4/10/34	27	Address—Matron Stanley	Miss K. Koch
Kybybolite	29/8/34	15	" Character," Mrs. L. Cook	Mrs. W. Kekwick
McLaren Flat...	4/10/34	16	" Cold Meat Recipes " ..	Miss I. Nicolle
Hope Forest and Dingabledinga	4/10/34	28	Discussion	Mrs. L. Fincher
Hope Forest and Dingabledinga	1/10/34	20	Annual Meeting	Mrs. L. Fincher
Morchard	26/9/34	18	Recipes	Mrs. C. Schulz
Tantanoola	4/10/34	10	Cake Competition	Mrs. E. Telfer
Warramboo	5/10/34	7	Paper from *Journal*	Mrs. A. Steer
Boor's Plains ..	4/10/34	20	Inaugural Meeting—F. C. Richards	Miss L. Stanway
Mangalo	11/9/34	—	Annual Social	Mrs. B. Coles
Mangalo	27/9/34	—	" Cheesemaking," H. D. Adams	Mrs. B. Coles
Rendelsham ...	2/10/34	14	" Yeast Recipes," Mrs. W. McArthur	Mrs. Z. Bignell
Clare	6/10/34	27	Biscuit Recipes	Mrs. A. Pollock
Wirrabara......	18/10/34	12	Congress Report	Miss Menz
Nelshaby	18/10/34	8	Congress Report	Miss T. Franks
Sheoak Log	18/10/34	23	Discussion	Miss K. Koch
Monarto South .	22/10/34	18	Cake Competition	Mrs. F. Liebelt
Kybybolite	18/9/34	19	Question Box	Mrs. W. Kekwick
Kangarilla	18/10/34	6	" Rugmaking," Mrs. Thorpe	Mrs. M. Steer
Wasleys	—/9/34	—	Annual Meeting	Miss J. Braun
Williamstown...	3/10/34	8	" Useful Hints," Mrs. Cundy	Mrs. Cundy
Warcowie	23/10/34	6	" Lunches." Mrs. R. Jarvis	Mrs. A. Crossman
Eurelia	21/10/34	10	Congress Report	Miss M. Scott
Gladstone	23/10/34	22	Congress Report	Mrs. L. Sargent
Taplan	24/10/34	—	Congress Report	Mrs. Flynn
McLaren Flat...	5/11/34	31	Social	Miss I. Nicolle
McLaren Flat...	8/11/34	25	Visit to Ellis Bakeries ...	Miss I. Nicholle
Boor's Plains ..	1/11/34	20	" Chicken Raising," Mrs. R. Yelland	Miss L. Stanway
Saddleworth ...	6/11/34	17	Congress Report	Miss G. Frost
Pinnaroo	5/10/34	17	Scone Competition	Mrs. F. Atze
Pinnaroo	2/11/34	15	Discussion	Mrs. F. Atze
Auburn	26/10/34	9	Congress Report	Miss L. Dennison
Warramboo	26/10/34	12	Congress Report	Mrs. A. Steer
Mundalla	25/10/34	14	Congress Report	Miss M. Fisher
Belalie.........	13/11/34	38	Address—E. L. Orchard .	Mrs. E. Orchard
Penola	7/11/34	34	Congress Report	Mrs. E. Kidman
Clare	3/11/34	40	" Flowers," Mrs. F. Pink	Mrs. H. Pollock
Tantanoola	31/10/34	14	" Millinery," Mrs. Bird ..	Mrs. E. Telfer

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA

VOL. XXXVIII. JANUARY, 1935. No. 6.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS. PAGE

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

River Murray Swamp Areas, at Murray Bridge (Jervois Branch), Thursday, February 21st (F. P. Baily, Woods Point, Secretary).

Yorke Peninsula, at Kadina (Boor's Plains Branch), March 6th, S. G. Chynoweth (Secretary).

Mid-North, at Redhill, Thursday, March 14th (S. A. Pengilly, Secretary).

South-East (Upper), at Mundalla, Wednesday, March 20th (A. Ross, Secretary).

South-East (Lower), at Mount Gambier, Wednesday, April 10th (G. T. Gurry), Secretary).

River Murray, at Moorook, Thursday, June 20th (S. Perkins, Secretary).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Decomposed Oyster Shells as a Fertiliser.

"Koolunga" asks what benefit is land in this district likely to derive from the use of partially decomposed oyster shells?"

Professor A. J. Perkins (Director of Agriculture), to whom this question was submitted, says.—"I realise that a good deal of propaganda on behalf of this material, under the name of calcium carbonate, has taken place within recent years. It has been claimed that this substance would supersede superphosphate and prove very much cheaper. Needless to say, the only value of the substance is the amount of lime in easily accessible form to the roots of plants. It follows that, generally speaking, it is not likely to prove useful, except in those districts which are deficient in lime. This applies to the Hills Districts generally, portion of the South-East, Kangaroo Island, and the extreme southern portion of Eyre's Peninsula, but over the great bulk of South Australian agricultural lands the addition of carbonate of lime would be sheer waste of time and money, as they are already well supplied with lime. I certainly cannot recommend it for the Koolunga district."

Mr. Spafford's Visit Abroad.

In a letter to the Director of Agriculture (Prof. Perkins), Mr. W. J. Spafford (Deputy Director), who is on a visit to other countries, states that during his brief stay in New Zealand the officers of the Department of Agriculture enabled him to see a lot of the agriculture of the Dominion and some of the information he obtained will be included in his report to the Government on his return.

He describes the pastures of New Zealand as "wonderful." He has visited Pure-Seed Stations, Multiplication Plots, and farm pastures in order to investigate the production of pastures and seeds and to obtain first-hand knowledge of the Certification of Seeds Scheme which is being so successfully operated by the Department in New Zealand.

Mr. Spafford was fortunate in being in New Zealand at the commencement of the season for exporting fat lambs. By calling on producers, stud breeders, and slaughter works he has secured a lot of data which when published will prove of great value to our producers. A large area of sea marsh which was raised above sea level by the Napier earthquake is being reclaimed by drainage. As well as reclaiming saline land, the New Zealand Government is bringing into production useless pumice lands, and although the methods adopted are not directly applicable to our State, much useful knowledge has been gained by investigating them.

A visit was made to the Lincoln and Massey Agricultural Colleges. At Massey, a very simple and efficient method of discovering the exact amount of hair appearing amongst the wool of long-woolled sheep has been developed, and breeders are so impressed by it that thousands of stud animals are being tested and recorded. Mr. Spafford thinks that this practice may prove useful to South Australian stud breeders of English sheep and perhaps even for Corriedales and Coarse Merinos.

Seed Wheat from Turretfield.

Throughout South Australia there is difficulty in securing any quantity of first quality seed wheat, and in order to assist in overcoming this disadvantage, the function of the Government Farm at Turretfield during the past two years has been to select and develop pure strains of the best varieties, so that supplies of reliable seed should be available for disposal to farmers.

The plan of improvement and purification adopted, namely, building up from hand-selected ears, is not yet in full operation, as four seasons must elapse before the multiplication process is completed and seed of that selection increased sufficiently to allow of grain being offered for sale.

However, in the meantime bulk purification has been conducted, and good seed of Federation, Ford, Ghurka, Nabawa, Ranee 4H, Sultan, Sword, and Waratah varieties is available this year. The price for graded grain has been fixed at 3s. 4d. per bushel on trucks Sandy Creek, and farmers requiring seed of the above wheats should make early application to the Manager of the Turretfield Seed Wheat Farm, Rosedale.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of Vol. I., No. 1, *Australian Wild Life*, the journal of the Wild Life Preservation Society of Australia, Science House, Gloucester Street, Sydney. In a foreword the editor claims that the society has been a very potent agency for good in the community and has helped in no small measure to preserve for future generations of Australians that extraordinarily valuable and unique legacy handed down to them in the form of the wild life of our bush lands. The annual subscription is 5s.

Scott's Book, the life and Mildenhall-Melbourne flight of C. W. A. Scott, told by himself. Published by Hodder and Stoughton Ltd. Price, 7s. 6d.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"Taldra" reports pony with swollen head and discharge of pus from the nostrils.

Reply—The condition may be strangles. Keep isolated in airy quarters and put on to laxative diet (green feed—mashes). Give inhalations of steam medicated with eucalyptus or turpentine and sponge nostrils at intervals to keep free from accumulations of discharge. To hasten ripening, foment swelling under jaw or rub daily with some stimulating embrocation. When soft, lance abscess and drain of its purulent contents. Syringe abscess cavity out daily with weak antiseptic solution until all discharge ceases. During convalescence give 1 tablespoonful of Fowler's solution of arsenic night and morning for 10 days on top of damped feed.

Secretary Hope Forest Agricultural Bureau reports—(1) *Itch on mane and legs of horses;* (2) *cause of and treatment for cowpox;* (3) *horse with injury to knee of front leg.*

Replies—(1) The trouble is a form of mange. To treat, wash the affected parts thoroughly with soap and warm water in which has been dissolved some washing soda, using an old scrubbing brush to work the solution on to the skin at the roots of the

hairs. When all scabs, scurf, &c., have been removed by this washing, dry the parts gently. Subsequently dress every other day (three or four applications) with the following:—Lysol, 2 tablespoonsful; raw linseed oil, 1 pint. Rub this dressing well into the roots of the hair. (2) Cowpox is caused by an ultravisible virus. It is readily transmitted from one animal to another and from cattle to human beings. Affected animals are better isolated from healthy ones, or if this is not possible, the handling of them should be left till the last and the attendant's hands subsequently washed in an antiseptic solution. The disease will run its course, and if the lesions are kept clean and are anointed with a little zinc oxide ointment before milking and dusted with dry boracic acid powder after milking, little else is required. It is not advisable to use the milk for human consumption until the case clears up. If it is healthy in appearance, the milk could be used, after boiling, for calves or pigs. (3) So long as there is heat

and pain in the swelling, apply frequent fomentations of hot water. Subsequently paint daily with tincture iodine or rub in for 15-20 minutes a little 1 to 8 red iodide of mercury blister. Clip hair over swelling before applying the blister and keep the animal tied up short for a few hours until the irritating effects of the blister have worn off. The following day wash off any remains of the blister, snip any unbroken blisters, and anoint the part with lard or sweet oil. Then turn animal out for a spell. If necessary, repeat the blister again a month later.

Secretary Blackheath Agricultural Bureau asks if oats pickled with bluestone would be injurious when fed to horses.

Reply—If the oats are pickled in a 1 per cent. solution of bluestone the grain could be used for horses provided that it is mixed with 2 parts of unpickled oats.

SORGHUM POISONING.

[By C. McKenna, B.V.S., M.R.C.V.S.]

During the past few weeks reports have been received by the Stock and Brands Department of losses amongst dairy cattle grazing on Sorghum. The history was that the cattle had been turned on to a young "second" growth of Sorghum which had appeared after the main crop had been harvested (in one case by grasshoppers). The mortalities were heavy and one dairyman lost nine cows.

The poisoning is due to the presence of Prussic Acid in the Sorghum plant at certain stages of its growth. Prussic Acid poisoning is sudden and rapid in its action. In order to prevent such mortalities in farm stock, the following points are emphasised:

(1) Crops of the Sorghum family (Sorghum and Johnson Grass, and also Sorghum-Sudan Grass hybrids) must be regarded as poisonous to stock until they have reached the flowering stage.

(2) The poisonous properties are likely to be most marked if the plants have been stunted by dry conditions or frost, or if grown on soils rich in nitrogen.

(3) Wilting does not necessarily destroy the dangerous properties, although it often has that effect.

Sudan grass (which is one of the Sorghum family) itself is not known to be dangerous at any stage of growth. However, in practice Sudan grass seed may not be "pure." The impurities are chiefly Sorghum-Sudan grass hybrids seeds. A crop grown from such seed is dangerous, as the Sorghum-Sudan grass hybrid plant is probably more poisonous than the Sorghum.

Since the above note was written, a further mortality has been reported. In this case nine cows were grazed on a crop of Sudan grass, which had previously been attacked by grasshoppers. The owner states that symptoms developed within a few minutes after the cows commenced feeding, and seven died in a short period. It is not known whether this crop of Sudan grass was produced from pure seed, but it is suggested that the same precautions should be taken in feeding Sudan grass to stock as have been recommended for the prevention of Sorghum poisoning.

As regards medical treatment of Sorghum poisoning, this is usually ineffective, owing to the rapid action of the poison. The following treatment could, however, be tried in the case of a cow:—

(1) Give the following drench immediately:—Oil of turpentine, 2ozs.; aromatic spirits of ammonia, 2 ozs.; raw linseed oil, 1 pint. (If the aromatic spirits of ammonia is not available, give in place of it 1oz. of household cloudy ammonia.)

(2) Subsequently give every hour as a drench:—1oz. of aromatic spirits of ammonia (or ½oz. of household ammonia in 2 pints of water).

The above treatment is also useful where "bloating" occurs as a complication.

SOME PARTING REFLEXIONS ON WHEAT GROWING IN SOUTH AUSTRALIA.

[Paper read by ARTHUR J. PERKINS (Director of Agriculture) at the 45th Congress of the Agricultural Bureau.]

I. INTRODUCTORY.

It must have come as a shock to most of us to find that the future of Wheat in South Australia, upon which the community had learnt to lean from its earliest days, should be questioned not only by farmers, exasperated by the cumulative losses of four successive seasons, by rival producing countries, by markets that we had come to look upon as our own, but even by sober-minded, and ostensibly impartial economists. In the latter connection I shall draw attention to an interesting article from the pen of Professor W. Henkelmann, which appeared recently in the International Review of Agriculture; it was entitled "Population Development, Wheat Production and Wheat Trade of the World."

The writer of this article argued that the great expansion of Wheat production in the nineteenth century and subsequent years was in the main attributable to the unparalleled expansion of World Population during the same period. In 1800 World Population was not quite 600 millions; in 1870 it had risen to 1,400 millions, and in 1930 to over 2,000 millions. During the past 100 years World population had doubled and relatively to 1800 it had more than trebled. This unusual increase in population led to the belief towards the middle of last century that the World was heading for extinction by famine. Malthus gave voice to the popular conception on the subject by asserting that whilst population increased in geometric progression, the production of foodstuffs increased in arithmetic progression only, and that the ultimate goal would be World famine, unless the practice of birth control became a matter of common acceptance. Hence, there is little doubt that this rapid increase of mouths to feed rendered possible, and for the time being perhaps necessary, corresponding development of unexploited colonial lands, and among the latter, of Australia; these virgin soils were required to provide adequate food for the teeming millions of the many countries that were rapidly becoming industrialised.

It would appear, however, according to the writer of the article we are considering, that the period of population expansion was rapidly drawing to a close, and that unless producing areas should be correspondingly reduced we would have to face a prolonged period of glut in foodstuffs, and unremunerative World prices for the same. At the same time Henkelmann admitted that for the present World Population continued to expand, but claimed that owing to reduction of deaths as well as births, the age character of World population was changing, and that it would not be long before the general decline in births would bring us face to face with a net population decline.

I have quoted these views because they are of general interest and because the writer of the article appeared to be biassed against the technical development of colonial expansion and committed himself to the following unacceptable view:—"The large Australian stocks (of wheat) still overshadow the World Market and prevent any improvement of the Wheat Market situation in the near future. Australia will be forced by prevailing conditions once more to restrict areas under Wheat cultivation." How the blame for low prices can justly be placed upon Australia

passes my comprehension; on the writer's own showing Australia's accumulated stock on August 1st, 1932, aggregated less than 40 million bushels, whereas on the same date total World Stocks amounted to 969 million bushels, of which U.S.A. held over 338 million Bushels and the Argentine nearly 60 million Bushels. Why, then, blame Australia for holding not much more than 4 per cent. of the Wheat available in the World on the 1st of August, 1932? As to the suggestion that Australia should reduce its wheat areas, I propose dealing with it later on.

II. THE IMPORTANCE OF WHEAT TO SOUTH AUSTRALIA.

Before attacking the problems of the future and suggestions to reduce areas under crop, I want you to consider briefly what Wheat has meant to South Australia since its inception. It can, I think, be said without any exaggeration that had not Wheat adapted itself to our special climatic, soil, and economic conditions, South Australia, at all events, and perhaps much of the rest of the Commonwealth as well, would still be in partially developed condition only, with a relatively unimportant scattered pastoral population; and although it may seem anomalous, it seems probable that in the absence of Wheat our Flocks and Herds would have been no greater, if indeed as great, than is the case at the present time, when so large a proportion of our land is directly or indirectly connected with Wheat. The fact that two-thirds of South Australia's arable land—10 million acres —was originally under Mallee Scrub confirms this view. Normally, Mallee Land carries no feed except from occasional areas of bare open plain land, and none of the land under scrub could have been economically converted into pastures except by submitting it to prior Wheat cultivation. It is impossible to imagine any other crop that could have taken the place of Wheat in the progressive development of South Australia.

Our records do not go sufficiently far back to permit of statistical measurement of the benefits of Wheat to the State since its inception in 1836. We have, however, complete records back to 1865, *i.e.*, a period of 72 years. These data show that during these 72 years we produced 1,109,775,256 bushels of wheat, representing at the average price of 4s. 7¾d. an aggregate value of £257,791,544. At the same time the values of our exported Breadstuffs over the same period aggregated £195,720,426, which sum was used towards meeting the costs of overseas purchases and the payment of interest on money borrowed to hasten the State's development.

It can be added that Wheat has also supplied our people with a cheap foodstuff, assisted in the development of Live Stock Industries, and supplied a section of the population with one of the healthiest occupations on Earth.

In Table I. at the back of this statement I have summarised in quinquennial periods the main results of these seventy-two years of Wheat-growing.

III. UNREMUNERATIVE RANGE OF 1930-1934 WHEAT PRICES.

I have already referred to the restiveness of farmers under the unremunerative prices of four successive seasons; and, speaking personally, whilst I find such restiveness amply justified, I cannot subscribe to the view that our farmers can afford to slide out of Wheat-growing, or even to curtail the area sown to any appreciable degree. Let us consider the question of prices first. I have shown below the Government Statist's mean prices realised by wheat at outports in each of these four seasons, and with these figures I have associated State Mean Yields per acre together with the calculated Mean Returns per acre.

Seasons.	Mean Price per Bushel at Outports.	Mean Yield per Acre.	Mean Gross Return per Acre = Mean Price x Mean Yield per Acre.
	s. d.	Bush.	£ s. d.
1930-31	2 3½	8.34	0 19 1
1931-32	3 2	11.81	1 17 5
1932-33	2 9¾	10.43	1 9 4
1933-34	2 8 (estimate)	9.26	1 4 8
Means , ...	2 9.28	9.96	1 7 7
At railway siding	2 3.78	—	1 3 1

The above statement shows that for the four seasons closing on June 30th, 1934, the mean price of Wheat at outports was 2s. 9¼d. per Bushel, the mean yield per acre 9.96 bushels, and consequently the mean gross return to the average farmer £1 7s. 7d. per acre for Wheat delivered at the farmer's expense to nearest shipping port; but as farmers generally sell their wheat at the nearest siding, it will be necessary to deduct from the mean price per Bushel at outports the mean railage 4d., plus usual country charges 1½d. This will reduce the average price per Bushel at the farmer's siding to 2s. 3¾d. and the average gross return per acre to £1 3s. 1d. It can be stated with confidence that neither the mean gross return of the four seasons—£1 3s. 1d. per acre—nor the individual returns of any one season could balance the corresponding costs of the average farmer. In support of this view let me quote the Mean Costs per acre of a private Mallee Farm, the accounts of which were kept by officers of the Department of Agriculture during three consecutive seasons—1929-32. These Costs can be summarised as follows:—

Mean 1929-32 *Costs of Growing Wheat on a Mallee Farm, the Mean Yield of which was* 16.92 *Bushels to the Acre.*

Preparation of Fallows	£0 12 1
Seeding Operations	0 11 3
Harvest Operations	0 11 2
Balance of Expenditure	0 14 2
Total Expenditure per Acre	2 8 8

Note.—In the above expenditure "cost" of conveying the grain to the nearest railway siding has NOT been included.

If in the above connection we should multiply the mean yield per acre —16.92 Bushels—by the mean price of Wheat at a siding during the past four seasons—2s. 3.78d. per Bushel—we should get £1 19s. 2d., which would have represented to the owner of the farm a loss of 9s. 6d. per acre per annum, plus whatever it might have cost him to convey the Wheat to the nearest siding.

IV. THE PAYING AND NON-PAYING WHEAT FARMS OF SOUTH AUSTRALIA.

But because during the past four seasons the mean price paid for Wheat has been demonstrably lower than the mean Costs of Production of the average farmer, it does not follow that such must have been the case for *all* farmers alike. In order to make this point clear, I have summarised in Table II., at the end of this statement, the mean position of Wheat Production in South Australia for the eight-year period closing on June 30th, 1933 (but excluding 1927-28, for which figures were not available). In this Table all the Wheat Farms of the State have been grouped together in accordance with their mean yields per acre, and the data given comprise—

(1) Number of Farms in each group;
(2) Total area under Wheat in each group;
(3) Total production of each group;
(4) Mean yields per acre of each group; and
(5) Mean gross returns per acre in each group, on the basis of 2s. 3.78d. per Bushel.

In this Table I have assumed—and I believe with good reason—that no Farm could be expected to meet average costs of production that does not return £2 gross or more per acre. On this basis it has been possible to separate out South Australian Farms into two divisions, comprising three groups in each. The first Division would include farms which were unable to pay their way during the four-year period ending on June 30th, 1934, and the second Division those that were able to do so. Unfortunately, the former included the vast majority of our farms, namely, 11,135, or 82.78 per cent., which averaged 7.93 Bushels per acre and 18s. 4d. per acre only in the way of gross return. These farms included 87.25 per cent. of the area under Wheat in South Australia, and 71.11 per cent. of the Wheat raised in the State. The more fortunate farmers, whom we have assumed to have paid their way during these four years of low prices, were represented by 2,316 farms, or 17.22 only of the State total. The mean area sown to Wheat on these farms and the mean quantity of Wheat harvested were 12.75 per cent. and 28.89 per cent. of the respective State totals, whilst the corresponding gross return per acre at 2s. 3.78d. was £2 11s.

Nobody can claim that results such as these were satisfactory to the State or to the individuals concerned, and however unpalatable the truth may be, it is necessary to stress the fact that unduly low monetary returns per acre are quite as much the consequence of low mean grain yields per acre as of low mean prices per bushel; and moreover, that unfavourable weather conditions are not usually the only factors responsible for these low mean yields per acre. In other words, we cannot escape the conclusion that the low farm revenues that we all deplore are frequently the natural consequence of faulty or slovenly farming practices. After almost a century of Wheat-growing and all that a century should have taught us, it is surely anomalous that during the past eight seasons there should still have been an average of 1,634 farmers, or more than 12 per cent. of the State mean total, whose mean yield per acre was 1.37 Bushels only, and whose corresponding monetary return per acre at 2s. 3.78d. per Bushel was 3s. 2d. only; or that 3,647 farmers, or more than one-quarter of the State total, should have averaged no more than 3 Bushels per acre, with a corresponding mean monetary return of 6s. 11d. per acre only. I know that it can be said that weather conditions were unfavorable during several of these eight seasons; but unfavorable weather conditions did not prevent an average of 962 farmers from reaping 23.23 Bushels per acre during the same period; 248 farmers 29.08 Bushels; and 57 farmers 35.74 Bushels.

Indeed, if we take the best of these seasons, namely, 1926-27, when the State average reached 12.84 Bushels per acre, there were still 1,513 farmers whose mean yield per acre was 4.16 Bushels only.

V. WHEAT GROWING IN SOUTH AUSTRALIA AND THE OTHER STATES.

Unfortunately, these high proportions of regrettably low yields are damaging not only to the farmers concerned but also to the prestige and material interests of South Australia as well. It should not be forgotten that with us Wheat is a National asset as well as a sectional occupation. There was a time when it was our common boast that we had taught the Sister States how to grow Wheat; and perhaps such a boast was more or less justified at the time. Latterly, however, it would seem that the pupils have bettered their instruction, in proof whereof I append a statement setting out recent mean yields of Wheat per acre in the Commonwealth and the several States:—

Australian Mean Wheat Yields per Acre, 1927-28 *to* 1932-33.

Seasons.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Federal Capital Territory.	Common-wealth.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
1927-28	8·92	8·54	17·50	8·16	12·12	26·25	7·12	9·63
1928-29	12·04	12·59	11·54	7·79	10·10	20·17	11·88	10·76
1929-30	8·66	7·13	20·75	6·40	10·95	22·37	19·06	8·47
1930-31	12·83	11·70	18·76	8 34	13·53	20·49	13·73	11·76
1931-32	14·92	11·77	15·33	11·81	13·14	15·61	16·84	12·93
1932-33	16·40	14·81	9·90	10·43	12·30	20·63	18·74	13·55
Means	12·55	11·13	15·61	8·93	12 05	21·65	16·08	11·27

The statement on previous page shows that for the six-year period ending on June 30th, 1933:—

(1). The Mean Wheat Yields per acre were in the following order:—

	Bushels per Acre.
a. Tasmania	21.65
b. Federal Capital Territory	16.08
c. Queensland	15.61
d. New South Wales	12.55
e. Western Australia	12.05
f. Victoria	11.13
g. South Australia	8.93
Commonwealth	11.27

Hence, whilst Tasmania led the way with a Mean Wheat Yield of 21.65 Bushels, South Australia brought up the rear with 8.93 Bushels only.

(2). In each of the six seasons the South Australian Mean Yield per acre was less than the Commonwealth mean yield.

(3). In three of the six seasons the South Australian Mean Yields were the lowest in the Commonwealth; but in the other three they occupied the penultimate positions, with Federal Capital Territory last in 1927-28, Victoria last in 1931-32, and Queensland last in 1932-33.

This is one of the last, if not the last address, that I shall have the pleasure of delivering before Congress, and none more than myself regrets that during the course of its delivery I should have found it necessary to stress these unpalatable facts; and if I have done so at all, it is because I have always felt that whatever the legal fiction of the day might happen to be, private ownership could not abrogate the State's natural overlordship of all land within its jurisdiction, nor the implied obligation that landholders would work their holdings not only from the standpoint of private gain, but from that of the special requirements of the community as well. From such a standpoint the man who reaped 6 bushels to the acre when it was both technically and economically possible for him to have reaped twelve, was wronging not only those immediately dependent upon him, but in addition the community which had entrusted the land to his care. Let me add here that this statement is made not without full appreciation of the many difficulties that beset the man on the land, and especially of those difficulties that have almost overwhelmed him of recent years. In support of this viewpoint I propose giving a striking illustration which I hope will appeal to you.

VI. SOUTH AUSTRALIAN WHEAT AND BARE FALLOW.

If there is one practice more than any other that has enabled us to continue growing Wheat in the teeth of unfavourable conditions, both economic and climatic, it is the recognised practice of sowing Wheat on land that in the immediately preceding nine or ten months had been treated as carefully tilled Bare Fallow. There is no other practice that has had a greater influence for good on our mean yields per acre; fertilisers, quality and quantity of seed, time of sowing, treatment against disease, etc., count for little or nothing unless the land had been adequately fallowed in the preceding season. And it can be said without the slightest exaggeration that in South Australia out of every 100 acres sown to Wheat not more than one acre could be expected to be profitable if sown on stubbles or on grass land. It is not as if all this were a matter of mere

personal opinion. During the past forty years or so you have had it thundered at you from hundreds of platforms; you have seen it demonstrated on Government experimental plots and farms; you have seen it confirmed on your neighbours' farms; indeed, it has been the life-long experience of nine men out of every ten of you. How, then, is it that during the past ten years out of every 100 acres sown to Wheat in South Australia 60 acres only had been fallowed If you refer to Table III. at the back of this statement you will find the proof of my contention; you will note there, too, that whereas during these ten years the mean yield of Wheat sown on Bare Fallow was nearly 12½ Bushels per acre, that of Wheat sown on land that had not been fallowed was 5½ Bushels only. There in a nutshell we have the main cause of South Australia's recent low mean yields per acre and the inglorious position we have come to occupy among the other Wheat-producing States.

The chief sinners in this direction are to be found on Eyre's Peninsula and in the Murray-Mallee Statistical Division. On Eyre's Peninsula during the ten-year period which ended in 1933-34, for every 100 acres sown to Wheat 31 acres only had been treated as Bare Fallow; the latter yielded a mean return of 9.14 Bushels per acre, whereas the corresponding 69 per cent. of the land yielded 5.21 Bushels only.

In the Murray Mallee Division during the same period for every 100 acres sown to Wheat 47 acres only had been treated as Bare Fallow, with a mean yield of 8.68 Bushels per acre, as against 5.81 Bushels for the balance of the land that had not been fallowed.

Nevertheless, it must be admitted that there is much to be said for the attitude of Mallee Farmers in this matter, at all events to the extent that it concerns their pioneering days. The usual inadequacy of initial Capital may be said to have forced upon them rather crude, and eventually lengthy, and therefore costly, methods of scrub reclamation. In usual practice the first crop has been sown in the ashes of the first "burn" of recently rolled Mallee Scrub. This primitive treatment has, however, never sufficed to eradicate the Mallee. In subsequent years fierce stubble fires have been required to destroy Mallee Shoots that persisted in growing up with the Wheat crops, and this has meant many succeeding Wheat crops on such portions of the land as were not occupied by roots and underground stems. The man was lucky who succeeded in completing the reclamation of his farm in ten years, and by that time he had usually forgotten how to farm. It is these facts which account in some measure for the evident reluctance of Mallee Farmers to sow Wheat on well-tilled Bare Fallow even when their pioneering days are a long way behind them. Nevertheless, many a successful Mallee Farmer has told me that if he had started on a virgin Mallee Block with adequate Capital he would from the very outset have sown Wheat on Bare Fallow only.

Another unfortunate legacy of pioneering days is the obsession that as large a proportion of the farm as possible should be placed under Wheat every year. It does not yet seem to have been fully realised that on well-tilled fallow the same amount of Wheat can be harvested from one-half to one-third of the areas found necessary in pioneering days. It follows that these relatively light Mallee Lands continue to be placed far too frequently under Wheat with corresponding reduction in the mean yields per acre they might otherwise be returning. Nor does it seem to be realised that it is both simpler and cheaper to grow and handle 1,000 bags of Wheat

from 250 acres than from 500 acres. In principle, Mallee Land should not be brought under Wheat more frequently than once in three or four years, and in very light land at even greater intervals. It need not be thought that if this practice were more generally adopted there would be no economic use to which the land could be put in intervening years; every Mallee Farm should be stocked to its maximum livestock-carrying capacity, and when such was the case, grazing livestock, besides helping to maintain the fertility of land temporarily out of cultivation, should yield net returns not less than those that accrue from Wheat grown too frequently on the same area of land.

It should be unnecessary to stress the fact that the economic value of Bare Fallow before Wheat must depend very largely on the effectiveness of the tillage methods adopted by the farmer. In this connection one of the best recognised objectives of Bare Fallow is cleaning the land and preventing undesirable weeds from going to seed, and it can be added that probably no single factor exercises a more depressing influence on Wheat yields than unchecked Weed growth. It follows, therefore, that, among other things, tillage operations should be directed towards the elimination of any weeds that should appear from time to time on well-tilled Bare Fallow. It came, therefore, as a shock to my old-fashinoed ideas to learn at a recent Conference of Branches of the Agricultural Bureau that a farmer had no time for "pretty ploughing," but preferred to see the furrows standing on edge, only partly inverted, with stubble and rubbish showing on the surface. In the first place the gibe against "prettiness" seems to be misplaced, since it is a gibe against the symmetrical regularity of well-laid furrows, which in turn is an indication that not a foot of soil has escaped adequate tillage. There is many an acre of Wheat in South Australia, the mean yield of which has been appreciably reduced because of the patchiness and lack of prettiness of the ploughing. As to the incomplete inversion of the furrows and the retention on the surface of stubble and rubbish, the object would seem to have been to check the tendency of the soil to drift. Without wishing to discuss the effectiveness of the practice in the latter direction, it can be definitely stated that if adopted the control of weeds is bound to be defective, and that succeeding Wheat yields are bound to suffer accordingly. Moreover, if the main object in view is not to plough, but to check drift, then why make use of a plough at all? Why not fall back upon a cultivator which proportionally to area covered is of lighter draught, and correspondingly cheaper to work? After all, our benighted forefathers wasted a good deal of thought and effort in the progressive evolution of the Mouldboard, which eventually has been mathematically designed to slip under the furrow slice, to lift it progressively, and finally to invert it completely, in the course of which operations weeds and surface rubbish are completely turned under and left to decay beneath the inverted furrow slice. If modern ideas should suggest that the turning of the furrow was a work of supererogation, then let us scrap mouldboards ruthlessly, but in doing so, let us not imagine that our fallows will be well tilled, in the usual acceptance of the terms.

There is another popular saying anent fallowing to which I also take exception, namely, that Farmer Brown, let us say, lived on his fallows between ploughing and seeding time. It seems to me that all that can be said in the matter is that whilst Farmer Brown should no doubt be commended for his misdirected energy, it is probable that portion of his time and that of his teams might have been more profitably occupied elsewhere. Is it necessary to remind you that from the technical standpoint it is quite

as easy to over-work as to under-work land, particularly land relatively light in texture? Moreover, whilst it is true that the mean yield of a Wheat crop will depend very largely upon the adequacy of the tillage that preceded it, it is also true that every tillage operation in excess of what is strictly necessary tends to raise costs of production, and in these days of low prices this is a luxury which farmers can ill-afford. If we suppose fallows to have been cultivated once more than was strictly necessary, this would mean that unnecessary expenditure to the extent of 2s. 6d. to 3s. 6d. per acre would have been incurred, representing 2d. to 3d. per Bushel on a 15-Bushel crop!

In my judgment, unless weather conditions render field operations out of the question, there should be no holidays for horses between Seeding time and Fallowing; nor should they need them if they had been adequately tended and fed in the late summer, and during the course of seeding operations. Those who delay fallowing operations because of the bits of feed they are afraid of ploughing under are usually doing so at the expense of the succeeding year's Wheat Crop. Whether the land should be harrowed immediately after ploughing, or whether it should be left in the rough state throughout the winter, is more or less a matter of opinion depending probably upon local conditions. There are soils which heavy winter rains tend to beat down to a hard, impermeable crust whenever the surface layers have been broken down too fine; such soils had probably better be left in the rough state until Spring. Early harrowing no doubt prepares a better seed-bed for the early germination of weeds. and as such presents certain advantages: but speaking generally I would prefer completing the ploughing before calling in the harrows; and would not use the latter unless I thought they were required, which generally would be after the first cultivating. After all, harrowing costs in the neighbourhood of 1s. per acre, representing ¾d. per bushel on a 15 Bushel crop.

In the great majority of cases ploughing should be completed in the month of August and followed almost immediately afterwards by cross-cultivation. Any undue delay in this first cultivation will generally mean that over portion of the fallows, at all events, rising Spring temperatures will stimulate weeds into growth too vigorous to be dealt with effectively by cultivators; hence the ultimate consequences of this kind of delay would usually be increased costs of combined tillage operations, or abundant seeding of weeds on the fallows, or both. As to the number of tillage operations that should be given between ploughing and seeding, much will depend on circumstances; but usually three to four should suffice. The requisites that should guide our decisions in the matter can be summarised as follows:—The importance of breaking up the surface crust that forms over tilled soils following on appreciable falls of rain; the urgent need of preventing undesirable weeds from scattering their seed over the fallows; and from the standpoint of the subsequent healthy development of young wheat plants, the necessity to build up progressively an adequate seed-bed, consisting of 1½in. to 2in. of loose soil mulch, resting upon a firm, well-consolidated sub-surface layer. It remains to be added that the tillage of soils that are in dust-dry condition should be avoided as much as possible, and particularly so, if the soils are light in texture. Technical efficiency in the performance of these various operations will frequently depend upon the correct choice of time and way of giving effect to them, and errors of judgment in the matter will usually be reflected in increased costs of production, or reduced mean yields per acre, or in both.

There is one important point which I have hitherto deliberately avoided, and that is the question of depth of ploughing; and if I have done so, it is because I hoped that the subjects upon which we are in moderate agreement would pave the way for a single subject in which we might possibly find ourselves in complete disagreement. I have attended a sufficient number of country Conferences to know that I am addressing an audience of convinced exponents of ultra-shallow ploughing; nor can I altogether blame you for the faith that is in you, although I might at times think that with you the wish is father to the thought. In order to satisfy you that I am not approaching this question in an unreasonable frame of mind, I propose committing myself to a preliminary statement with which we shall all be in agreement. We all know that for every increased inch in the depth of the furrow we have to face a corresponding increase in draught, and consequently to a corresponding increase in costs of tillage; and in the circumstances one cannot imagine any person increasing his depth of ploughing unless he were first satisfied that such increase would presently or subsequently lead to improvement in mean crop yields sufficiently great to make adequate compensation for increase in mean costs of production.

It is generally recognised that the progressive improvement of the natural fertility of arable land was one of the main aims of the art of farming; and that among the factors that affect natural fertility depth of soil occupied an important position. If, on the other hand, we consider that in the majority of instances "Soil" as distinguished from "Sub-soil" can be described as that darkened surface layer with which organic matter has gradually become incorporated, then it would be correct to say that in the majority of instances the depth of the soil would be the depth of the deepest furrow usually adopted by the farmer. It follows, therefore, that if you were to cling unduly to a policy of unchanging shallow ploughing—say 2in. to 3in.—you would be declining to take advantage of one of the simplest methods of progressively improving the natural fertility of your farms. Every additional inch that is won from the subsoil would represent an additional layer of soil 1in. thick to which organic matter would be added; in which Bacterial Life would find more congenial environment; and over which the delicate roots of plant seedlings would roam more freely and to greater advantage; there would be progressive increase in the soil stock of available plant food; and increase in the powers of moisture absorption and moisture retention of the surface soil layers.

I recollect discussing this very same question many years ago with one of the most successful hay growers of my acquaintance—the late Mr. A. G. Both, of Roseworthy; he attributed his success, among other things, to the fact that he made it a practice to break up his fallows on a deeper furrow in alternate years; and this, I feel, is a policy which I can safely recommend to you. I realise, of course, that no man should be asked to break up land beyond the mean depth of penetration of the yearly rainfall; there can be no life activity, no mechanical reactions favourable to plant growth in the absence of adequate soil moisture, nor can you bring about that sub-surface consolidation so essential to young Wheat growth; but I cannot consider land in which the mean penetration of the annual rainfall does not exceed 2in. to 3in. as land that is adapted to ordinary farming operations. Let it go back to bush, and to Sheep and Cattle grazing.

VII. THE "STORY" OF RECENT LOW WHEAT PRICES.

But, if inadequate mean grain yields have been important causal factors of the unprofitableness of recent Wheat Crops, so, too, both directly and indirectly, have been the abnormally low prices of the same seasons. I have said "both directly and indirectly" advisedly, because apart altogether from the "direct" arithmetic result of such prices, their "indirect" but continued depressing influence on the temperaments of much harassed individuals, must also be taken into consideration. I can conceive of nothing more discouraging, more conducive to slackness, or more wasteful of honest, human effort, than the unescapable seasonal routine of land preparation, of putting in and taking off crops by those whose sub-consciousness must tell them that little can come of all this expenditure and effort. Hence, it seems inevitable that a succession of wastefully unprofitable seasons of this character must eventually sap the pride of work of human beings, and to this extent I agree that it can be said quite fairly that abnormally low Wheat prices extending over four consecutive seasons have been contributory factors in the regrettable decline of our recent State Mean Yields of Wheat per acre.

The story of these low prices is more or less known to you; nor do I propose dwelling upon it at any great length. In ultimate analysis it is to the Great War, together with the psychological and economic factors that came in its wake, that we can be said to owe this long period of unprecedently low prices. Within modern pre-war times Europe had always been the greatest Wheat-producing and Wheat-consuming Continent, and since the spread of industrialism, the greatest Wheat-importing Continent of the World. But the intensity of the 1914 War conditions had the effect of progressively depressing Europe's normal rural output, and eventually its pressing food requirements were met by the expansion of rural production in North and South America, and to a less extent in Australia as well. Unfortunately, in the years that immediately followed the Armistice Wheat prices rose to quite abnormal heights, and naturally led to further expansion in the production of extra-European countries; unfortunately, too, when between 1921 and 1924 Wheat prices began to drop to normal, American interests sought to recall the earlier high prices by a process they described as "orderly marketing"; in effect this process meant that the owners of the major portion of the World's exportable Wheat, would ration the depleted European markets, and check the arrival of any Wheat that might tend to reduce prices. Impoverished Europe was at the time still nursing her War Wounds and unable, therefore, effectively to counter this attempt to impose a dear loaf upon her people; hence, in the matter of prices, the American policy of "orderly marketing" may be said to have succeeded up to 1929-30. But as Europe could not afford to buy all the exportable Wheat available, and was, moreover, from year to year expanding her own output, and as no other purchasers were in sight at the time, "orderly marketing" came gradually to mean that whilst a moderate proportion of the season's supply was sold at a high figure, the unsold balance went to swell the carry-over of preceding seasons, until such time as these flouters of the law of Supply and Demand were no longer able to stand the financial strain involved, and prices crashed to undreamt of levels, from which they have not yet recovered.

It is, of course, true that under the influence of World-wide Economic Depression the prices of Wheat, in common with those of other commodities, would have fallen in any case from the abnormal heights of the early post-war years; but in the absence of so-called "orderly marketing" the fall would have been more gradual, nor would it have reached the depths we know of, and recovery would have been more rapid; because if the Law of Supply and Demand had been allowed to operate freely it would have checked the useless seasonal carry-over of unsaleable grain and prevented the expansion of new areas sown to Wheat under the stimulus of artificial high prices; nor, indeed, would European countries have gone to the extreme of encouraging the growth of Wheat on their own lands under what must be considered as wastefully uneconomic conditions.

VIII. PROBABLE WHEAT PRICES OF THE IMMEDIATE FUTURE.

But, whilst it is to be hoped that as a nation we shall endeavour to avoid the mistakes of the past, it is with the present, and the immediate future, that we are in the main concerned. From the latter standpoint, what are the price prospects that the future holds for us? My own impression is that we have at last come to the turning of a long and exceedingly disagreeable lane; it cannot be denied that prices have already improved appreciably since last harvest; and this notwithstanding the fact that Wheat has again become the plaything of gamblers and speculators. There is good reason to believe that whilst 1934 Harvest prices should be higher than those of the immediately preceding Season, the 1935 prices should tend to approach normal, unless, indeed, some new World stupidity should tend to interfere with the normal process of recovery.

In support of this statement it may be pointed out that the World price of Wheat is usually influenced by the following main factors:—

1. The magnitude of the Carry-over of Exportable Wheat (including Wheat afloat) on the 1st of August in any given season. This carry-over has been as follows of recent years:—

	Bushels.
1926-27	249.000,000
1927-28	319,000,000
1928-29	512,000,000
1929-30	502,000,000
1930-31	564,000,000
1931-32	588,000,000
1932-33	683,000,000
1933-34	661,000,000
Means of 1926-34	510,000,000

In these eight successive seasons the only August World carry-over of *Exportable* Wheat that was not appreciably in excess of World requirements was that recorded in 1926-27, namely, 249 million Bushels; but the carry-overs of the seven succeeding seasons were progressively

added to the accumulation of preceding seasons, and reached a climax in 1932-33 with a carry-over of 683 million Bushels. The effect of so huge a carry-over upon the price of Wheat in 1933-34 may be gauged by the following facts:—The estimated 1933-34 import requirements of Europe were assessed at 375 million Bushels, and those of extra-European countries at 150 million Bushels, *i.e.*, total World import requirements for the season of 525 million Bushels only. It follows, therefore, that with an August, 1933, carry-over of 683 million Bushels of *Exportable* Wheat, should the main Wheat-exporting countries—Canada, United States of America, Argentina, and Australia—have had not a surplus bushel to dispose of abroad from their 1933-34 crops, then the carry-over would still have sufficed to supply World 1933-34 import requirements, and to leave a carry-over of 158 million Bushels on August 1st, 1934. It will be realised, therefore, how much 1933-34 prices must have been depressed by the threat of this huge accumulation of Wheat. On the other hand, the slight difference between the 1932-33 carry-over and that of 1933-34, namely, 22 million Bushels only, might seem to justify the belief that the 1933-34 carry-over might exercise an equally sinister influence over 1934-35 Wheat prices; and this, no doubt, would be true but for counter influences operating in the opposite direction, to which reference will be made later on.

The mass effect of these favourable influences can be shown from the September, 1934, calculation of the probable carry-over of Exportable Wheat on August 1st, 1935. The figures upon which this estimate has been built have been supplied by the International Institute of Rome, through the kind offices of the Department of Commerce:—

	Bushels.	Bushels.
World exportable carry over, including Wheat afloat on August 1st, 1934	661,200,000	
1934-35 New Exportable Wheat, including 220,400,000 Bushels estimated for Southern Hemisphere	312,200,000	
		973,400,000
1934-35 Estimated Import requirements of Europe .	440,800,000	
1934-35 Estimated Import requirements of extra-European countries	128,600,000	
		569,400,000
Estimated World carry over of Exportable Wheat on August 1st, 1935		404,000,000

A glance at the immediately preceding statement will show that if the anticipated August, 1935, carry-over, namely, 404 million bushels, should prove approximately correct—and it can be added that the forecasts of the Institute of Rome have hitherto proved accurate—it would be the lowest recorded since 1927-28; it would, too, be sufficiently close to normal to warrant the belief that 1934-35 Wheat prices would be appreciably higher than those of 1933-34.

2. The relative magnitude and quality of the harvests in the Northern Hemisphere, which in August should be in full swing, is another factor influencing mean prices offered for Wheat in any season. Although definite figures on the subject are not yet available for 1934, it is known that both in Europe and in North America, but particularly in the latter Continent, the 1934 harvest returns will be considerably below those of recent years; and it has already been officially announced that U.S.A. would not be an exporter in 1934-35. How great must have been the deficiency in U.S.A. and Canada may be gauged from the figures given

in relation to the calculation of the probable August, 1935, Carry-over of *Exportable* Wheat. It is shown in this statement that the combined *Exportable* surpluses from 1934-35 Harvests of the Northern and Southern Hemispheres would aggregate 312,000,000 Bushels, in which 220,000,000 Bushels had been estimated as the probable contribution of the Southern Hemisphere. This means that 91,800,000 Bushels of new Wheat only was anticipated from U.S.A. and Canada; compare this figure with 584 million Bushels which was the corresponding figure for 1933-34. A drop of 492 millon Bushels in the matter of available new wheat, or 84 per cent., is a factor which is bound eventually to tell in favour of improvement in Wheat prices.

3. The relative magnitude and quality of the Harvests in the Southern Hemisphere will also, in due course, have its influence on the prices of Wheat. Argentina and Australia are the only two countries that count much in this aspect of the question; although at times India has made herself felt.

It is too early as yet to make even a rough guess as to the extent to which the Southern Hemisphere is likely to influence the position in 1934-35. We do know, however, that there will be appreciable reduction in areas sown; probably more than 10 per cent. relatively to 1933-34. It is equally certain, too, that seasonal conditions have not hitherto been as favourable as in 1933-34; and it may be concluded that the 1934-35 exportable surplus of the Southern Hemisphere will probably be less than that of 1933-34; hence, another factor favouring improvement in current Wheat prices.

4. The prospective requirements of importing countries, and particularly of Europe taken as a whole, must exercise an important influence on the trend of future Wheat prices. In a measure this factor is more or less related to, and frequently a direct consequence of the relative magnitude of the Harvests in both Hemispheres. Nevertheless, it calls for special comment, since importing countries themselves, from misadventure or miscalculation, may find themselves with August carry-overs above or below natural requirements, and their prospective imports would be calculated accordingly; again, according to political views in the ascendant at the time, special measures might have been adopted to encourage or to discourage the importation of Wheat.

In this connection it should be noted that several European countries, which hitherto had been looked upon as important importers of Wheat, such as France, Germany, Italy, &c., have within recent years turned towards self-sufficiency in the matter; and so successful have they been that some of them are nursing embarrassing surpluses to-day. Take France, for instance, with a surplus above national requirements of 80 million Bushels, for which the French farmer has been paid at the rate of 8s. 1½d. sterling per Bushel (10s. 2d. Australian currency), but the London value of which is not more than 2s. 6d. per Bushel. Unfortunately, the French Government. in order to encourage the growing of Wheat on the national soil, had not only guaranteed an absurdly high "home" price to local farmers, but in addition had undertaken to pay the difference between the home value and the export value of any Wheat grown in excess of home requirements. It is stated that this rash guarantee is likely to cost the French Government something

like £22,000,000; but the London Corn Trade Association considered that this was an expenditure which the French Government was unlikely to incur.

How long policies of this character are likely to endure it is difficult to say; but it is certain that if 8s. to 12s. per bushel be guaranteed to growers everybody will soon be growing Wheat in their back yards. At such prices, however, reaction is likely to come from the workers who, in industrialised countries, will no longer be able to afford a white loaf, and the economics of the position must in the end kill self-sufficiency in Wheat production for thickly populated countries with high land values. Hence, it can be considered that eventually common sense will overcome the difficulties which the policy of "self-sufficiency" in wheat is imposing upon World Wheat trade to-day.

In the matter of 1934-35 prices it seems probable that European requirements will be in excess of those of the immediately preceding year owing to less favourable Harvests.

5. The relative magnitude of other cereal crops in the Northern Hemisphere, chiefly Rye and Maize, must also be taken into account. The most recent information on the subject tends to show that neither crop is as good as in preceding years.

6. There are finally such minor factors as the slowly increasing consumption of White bread in rice-consuming countries; the gradual supersession of the black loaf by the white loaf in the rye-eating countries of Central and Eastern Europe; the progressive increase in population of white-loaf-eating countries, &c.; all these factors will tell gradually in favour of improvement of wheat prices. But against them, and of corresponding influence in the opposite direction, are the numerous restrictions against the free circulation of Wheat from country to country; the legal compulsory admixture of other ingredients with Wheat Flour, such as Potatoes, &c.; the reduced consumption of Cereal Foods in some countries, notably the United States of America, &c.

Such, then, is the general position to-day, and on the whole it seems to me that the prospects are favourable to improved Wheat prices for 1934-35.

IX. THE WHEAT GROWERS' CLAIM TO PROTECTION AGAINST APPARENTLY UNREMUNERATIVE WORLD WHEAT PRICES.

If in a moment of aberration I should protest that 35s. for a pair of locally made Boots was considerably more than reasonable costs of manufacture and distribution, I should probably be told that costs of manufacture and distribution had nothing to do with retail sales; that prices asked were usually those that average customers were prepared to pay and rivals to respect. On delving further into the matter I should find that the price of 35s. for a locally made pair of Boots would probably be determined as follows:—

The price of a similar pair of Boots in equal quality and value would be worth in London, say, 16s. in English currency, or 20s. in Australian currency; to the latter figure would, however, be added the following interesting items:—

	s.	d.
London value of Boots in Australian currency	20	0
Cases, Packing, Freight, &c.	0	11
Tariff and Primage charges	6	9
Sales Tax	1	4
Port Adelaide charges	0	2
	29	2
Add Retailer's charges	5	10
	35	0

That is why costs of manufacture and distribution count for nothing in the retail price of a locally made article; it is one of the consequences of attempted national "self-sufficiency" and one of the blessings of a "home price," which, however, is the main causal factor of high costs of production in Australia.

If, on the other hand, in order, let us say, to pay for these boots, I go to a miller with a good F.A.Q. sample of Wheat, he would probably offer me 2s. 8d. at the railway siding (September, 1934); but if I should protest that 2s. 8d. was considerably below my costs of production, he would say—like the boot-seller before him—that costs of production had nothing to do with the price paid to farmers for Wheat; that the latter was based upon London parity and determined upon the following lines:—

Let us suppose the value of Wheat in London to have been 27s. per quarter, 3s. 4½d. per Bushel in British currency, or 4s. 2½d. in Australian currency; but, in order to arrive at the price paid to the farmer for Wheat intended for home consumption, the following deductions would have to be made from the London price of Wheat expressed in Australian currency (Note—In a similar calculation relative to Boots the intermediate charges were *added, not deducted,* from the London price):—

	s.	d.	s.	d.
London Value of Wheat in Australian currency			4	2½
Less London charges	0	0¾		
Freight and Insurance	0	9½		
Port Adelaide charges	0	2¾		
Country Agent	0	1½		
Mean Rail Freight	0	4		
			1	6½
Farmers' Price for Wheat at average siding			2	8

Here, then, we have two examples of commodities the local prices of which were to all intents and purposes based upon London parity; in the one case the intermediate charges were added to the London "spot" price—Boots and all our protected industries—and in the other these charges were deducted from the London price—Wheat and our few unprotected industries. To add to the irony of the situation there is another characteristic difference between these two classes of industries, namely, our protected industries, lacking the stimulus of external competition, have been unable to acquire that degree of efficiency that should enable them to compete on even terms on the markets of the world; whereas our unprotected industries, the costs of production of which have been unduly swollen in order to pay the costs of inefficient

secondary industries, have had to carry the burden of producing the greater proportion of our exportable commodities, and to face the rigour of World Prices, not only abroad, but on the Home Market.

Observe that if Wheat were Boots or any other protected industrial commodity, its local consumption price, with London "spot" price at 4s. 2½d. (Australian currency), would not be 2s. 8d. per Bushel as at present, but not less than 5s. 9d. at the average railway siding.

A comparison of mean prices paid for Wheat in New Zealand, a country that does not produce enough Wheat for home consumption, and in South Australia, with a large export surplus, should not be without interest:—

	New Zealand.	South Australia.
	s. d.	s. d.
1924-25	6 7	6 1
1925-26	6 9	6 2¼
1926-27	6 2	5 3½
1927-28	6 4¼	5 5¼
1928-29	6 1½	4 8¾
1929-30	6 3¾	4 4
1930-31	5 10¼	2 3½
1931-32	4 10½	3 2
1932-33	4 4	2 9¾
Means	5 9	4 3

Consider that in 1930-31 the South Australian Farmer did not receive for his Wheat more than the equivalent of 2s. 3½d. per Bushel at outports; in the same year the New Zealand Farmer received the equivalent of 5s. 10¼d. Similarly, during the period of nine years which ended in 1932-33 the South Australian Farmer received for his Wheat the mean equivalent of 4s. 3d. per Bushel at outports, whereas over the same period the New Zealand Farmer received 5s. 9d. Nor has the New Zealand Farmer owed this premium of 1s. 6d. per Bushel to the higher intrinsic value of his Wheat, which on the World's Markets would probobly have brought a lower average price per Bushel than Australian F.A.Q., but to the fact that in New Zealand Wheat production is a relatively unimportant matter, and the industry has therefore been given the advantage of a protected market.

However much we might believe that in a country of vast unoccupied spaces and small scattered population primary production should be the main occupation of its inhabitants and the main concern of its Government; that *everything* should be done to foster its progressive development and to facilitate the access of its surplus products to suitable overseas markets; that *nothing* should be done, either directly or indirectly, that would tend to increase unduly its costs of production and to hamper primary production in its competitive struggles on the markets of the World; that tariffs, in short, should be used exclusively for revenue purposes and not for bolstering up exotic industries that can render but little service to the community, but which inevitably add to the burden of costs of primary production; however much one might believe in all these things, one is bound in the end to recognise

that in a World gone—temporarily one may hope—"self-sufficiency mad," and in a country that has groaned under high tariffs for 34 years, there is very little chance of adequate relief in the near future. And yet we cannot escape growing Wheat though the heavens should fall; and it is therefore satisfactory to know that a Royal Commission is inquiring into the disabilities of Wheatgrowers, and will shortly suggest special measures for their relief. Bounties have been announced in the past towards harvest time, and frequently without adequate consideration; but they may be excused on the grounds that those responsible do not seem to have grasped the fact that mean costs of rural production to-day are altogether out of keeping with current World prices. Hence, it is to be hoped that the Commission will suggest something better than periodical Bounties, something more in the nature of permanent relief and not of gratuity. Personally, I know of nothing more suitable in a country in which everything else is protected than a Home Price for Wheat used for local consumption.

It is, of course, true that the granting of such a price must lead to a rise in the cost of Bread until such time as the overseas parity of Wheat equals the guaranteed home price; and much sentimental talk on the subject has been indulged in, notwithstanding the fact that in Australia the Basic Minimum Wage is made to fluctuate with the rise or fall of prices of necessaries of life, and of these Bread is obviously one. Moreover, many other countries with far more important industrial populations than Australia have not hesitated to make provision for a special national price for Wheat, to which increases in the price of Bread have naturally corresponded. The examples set in this direction by both France and New Zealand have already been indicated; and quite recently the German Minister for Agriculture was reported to have boasted that he had doubled and quadrupled World prices of rural products. It can be pointed out, too, that in 1930-31, at a time when Australian Farmers were realising the equivalent of 2s. 3½d. per bushel at outports, the price of Wheat in Germany rose to 26 Reich marks per metric quintal, which corresponds to 14s. 2d. per Bushel in Australian currency. Similarly, in 1931 the price of Wheat in Spain was made to rise to the equivalent of 10s. per Bushel, Australian currency. Again in 1931 tariff duties on Wheat imported into Italy rose to 8s. 10¾d. (Australian currency) per Bushel, and on Wheaten Flour to £22 4s. 1d. (Australian currency) per short ton; whilst in 1933, in spite of a record harvest in the immediately preceding season, No. 2 Manitoba wheat was being quoted on the Milan market at 14s. 9d. (Australian currency) per Bushel, and ordinary Italian soft wheat at 10s. 7¼d. (Australian currency). In Switzerland of recent years the Government has guaranteed to farmers 17s. 2d. to 20s. 4d. per Bushel (Australian currency) on their farms. In the United States a special home price has been paid to farmers from the proceeds of a processing tax. And, finally, Great Britain—the protagonist of Free Trade since the Repeal of the Corn Laws in 1847—has guaranteed to her farmers 45s. per quarter, which in Australian currency represents about 7s. per bushel.

These examples should suffice to show that apparently Australia, although raising the cost of most other commodities by means of tariffs that are all but prohibitive, is among the few that hesitate to pay for

Wheat a price that will yield something more than mean inclusive costs of production. One can imagine that the Royal Commission has had this question under consideration; and in the circumstances an examination into what a home price for Wheat can do for farmers is advisable.

In the first place we should note that the home price cannot very well be less than 5s. per Bushel, which, after all, approximately represents the mean price paid for Wheat for the past seventy years (*vide* Table I.), and upon which the average price for Bread in Australia must have been built up. What would 5s. per Bushel paid for Wheat used in Australia for home consumption represent to the farmer, if we assume the balance of Marketable Wheat to realise no more than London parity?

During the five-year period closing in 1932 the mean quantity of Wheat exported annually from Australia was approximately 110 million Bushels, and the mean quantity gristed for human consumption about 32 million Bushels. If in this connection we assume the mean price of export wheat to be 3s. per Bushel and the "home" price 5s., then the average price collected by every Wheatgrower in the Commonwealth should be about 3s. 5½d. at outports; but if the "home" price were raised to 6s. per Bushel wheatgrowers should realise 3s. 8¼d. at outports. In contrast with the prices quoted for other countries, the suggested Australian prices do not appear particularly attractive; they should, however, permit us to live, which is perhaps all that we can expect at the present time.

There are good reasons for believing that the prices quoted above, namely, 5s. and 6s. respectively for Wheat to be gristed for home consumption, should not lead to Bread prices exceeding 5d. to 5½d. per 2lb. Loaf.

X. CONCLUDING REMARKS.

It is much to be feared that I have allowed this address to run away with me; and that it can now be said to have roamed from Dan to Beersheeba, having touched upon many topics, and having done justice to none. I realise, too, that you were already familiar with much that I have had to say, even with the least palatable portions of the address. I would like now to add that throughout the preparation of this address, I have tried to keep steadily before me what seemed to be the best interests of Australia and its farmers. Australia, in my opinion, cannot do without Wheat; and, notwithstanding recent talk to the contrary, we want not less, but more Wheat; but Australia should not expect Wheat to be grown under conditions that are unfair to those responsible for its growth. I recognise that latterly farmers have performed their tasks in times of considerable difficulty; that the majority of them and their dependants have had to face four unspeakable years; and if some should have done justice neither to themselves nor to the State, it can be said in extenuation that the progressive dwindling of hard-earned assets, the increasing pressure of intolerable debt, the association of low prices and unfavourable seasons, the utter futility of routine tasks that led nowhere, are so many factors that must eventually destroy the moral fibre of the stoutest-hearted; and I rejoice to think that definite signs of improvement are already in sight, and in the coming good days I trust that all will benefit.

TABLE I.—*Summarising the position of Wheat in South Australia since* 1861-1862.

Quinquennial Periods.	Mean Area under Wheat.	Mean Total Production.	Mean Value of Total Production.	Mean Yield per Acre.	Mean Value per Bushel.	Mean Gross Return per Acre = Mean Yield per Acre x Mean Price.
	Acres.	Bush.	£	Bush.	s. d.	£ s. d.
1861-66	353,600	3,957,050	1,329,962	11·19	6 8·66	3 15 3
1866-71	535,603	4,865,760	1,239,543	9·08	5 1·14	2 6 3
1871-76	795,112	7,896,867	1,996,706	9·93	5 0·68	2 10 2
1876-81	1,348,973	9,418,357	2,397,813	6·98	5 1·10	1 15 6
1881-86	1,786,783	9,975,027	2,159,818	5·58	4 3·97	1 4 2
1886-91	1,808,307	12,002,149	2,344,202	6·64	3 10·87	1 5 11
1891-96	1,558,724	8,601,036	1,337,540	5·52	3 1·32	0 17 2
1896-1901	1,747,773	7,060,906	1,091,522	4·04	3 1·10	0 12 6
1901-06	1,759,732	11,948,858	2,114,565	6·79	3 6·47	1 4 0
1906-11	1,826,817	21,095,664	4,012,641	11·55	3 9·65	2 3 11
1911-16	2,356,022	19,289,571	4,040,139	8·19	4 2·27	1 14 4
1916-21	2,282,990	29,322,782	8,886,270	12·84	6 0·73	3 17 10
1921-26	2,444,203	29,482,995	7,918,330	12·06	5 4·46	3 4 9
1926-31	3,396,321	28,933,487	6,269,648	8·52	4 3·92	1 16 10
Mean of 70 years	1,714,354	14,560,751	3,367,050	8·49	4 8¾	2 0 7
Recent Seasons—						
1930-31	4,180,513	34,871,526	3,995,696	8·34	2 3·50	0 19 1
1931-32	4,071,370	48,093,102	7,614,741	11·81	3 2·00	1 17 5
1932-33	4,066,782	42,429,614	5,966,664	10·43	2 9·75	1 9 4
1933-34	3,821,795	35,373,466	4,716,462	9·26	2 8·00	1 3 2
Means	4,035,115	40,191,927	5,573,391	9·96	2 9·28	1 7 7

TABLE II.—*Analysis of South Australian Wheat Production from the Standpoint of Mean Yields per Acre of Individual Farms.*
(1925-26 to 1932-33—excluding 1927-28).

Range of Respective Yields per Acre.	Number of Farms.	Mean Total Areas under Wheat.	Mean Total Production of Farms.	Mean Yield per Acre.	Calculated Mean Gross Return per Acre at 2s. 3·78d. per Bushel.
	Nos.	Acres.	Bushels.	Bushels.	£ s. d.
Under 6 bushels	3,647	1,167,823	3,506,758	3·00	0 7 11
6 bushels and under 12	4,267	1,187,451	10,395,689	8·75	1 0 3
12 bushels and under 18	3,221	716,264	10,450,493	14·59	1 13 9
Farms not paying their way at 2s. 3·78d. per bushel	11,135	3,071,538	24,352,940	7·93	0 18 4
Percentages of whole	82·78%	87 25%	71·11%	—	—
18 and under 27 bushels	2,011	402,006	8,484,349	21·11	2 8 10
27 and under 33 bushels	248	40,783	1,186,062	29·08	3 7 4
33 and upward	57	6,250	223,397	35·74	4 2 9
Farms assumed to pay their way at 2s. 3·78d. per bushel	2.316	449,039	9,893,808	22·03	2 11 0
Percentages of whole	17·22%	12 75%	28·89%	—	—
GRAND TOTAL	13,451	3,520,577	34,246,743	9·73	1 2 6

Table III.—*Contrasting Mean Production of Wheat sown on Bare Fallow with corresponding production of Wheat sown on land that had not been fallowed* (1924-34).

Seasons.	Wheat Sown on Bare Fallow.			Wheat not Sown on Bare Fallow.		
	Acres Sown.	Total Production.	Mean Yield per Acre.	Areas Sown.	Total Production.	Mean Yield per Acre.
	Acres.	Bushels.	Bushels.	Acres.	Bushels.	Bushels.
1924-25	1,670,597	24,645,303	14·75	829,255	5,883,322	7·09
1925-26	1,598,372	22,823,552	14·28	867,276	5,779,549	6·66
1926-27	1,771,693	27,088,657	15·29	996,710	8,470,054	8·50
1927-28	1,879,398	20,271,891	10·79	1,061,962	3,794,121	3·57
1928-29	2,010,386	21,586,031	10·74	1,435,177	5,240,063	3·65
1929-30	2,083,769	18,904,280	9·07	1,561,895	4,440,813	2·84
1930-31	2,146,765	23,718,522	11·05	2,033,748	11,153,004	5·48
1931-32	2,385,066	35,323,251	14·81	1,686,304	12,769,851	7·57
1932-33	2,420,674	31,129,859	12·86	1,646,108	11,299,755	6·86
1933-34	2,508,581	29,092,873	11·57	1,313,214	6,280,593	4·78
Means	2,047,530	25,458,422	12·43	1,343,165	7,511,113	5·59
Percentages of total	60·39%	77·22%	—	39·61%	22·78%	—

PASTURE SPECIES FOR THE NON-IRRIGATED GRASSLANDS OF SOUTH AUSTRALIA.

[Paper read by R. C. SCOTT, R.D.A. (Supervisor of Experimental Work), at the 45th Congress of the Agricultural Bureau.]

Cereal cropping is the most important division in the agricultural practice of South Australia, but at the same time grassland products also occupy a prominent position.

There are large areas of relatively high rainfall country which are not well suited to the production of cereals, whilst in a number of districts the regular planting of wheat is simply being adopted as an economic means of cleaning and developing the land. Frequent wheatgrowing in these localities is only a temporary measure, and as soon as the scrub conditions permit or the provision of water, fences, &c., allow for the carrying of livestock so will wheat be relatively widely spaced in the cropping rotation planned.

Therefore, the future advancement of the State lies more and more in the direction of livestock husbandry, and this implies that increased attention must be given to pastures, grassland management, and the problems associated with this branch of agriculture.

However, it does not necessarily mean that there will be any reduction in the quantity of wheat produced in South Australia but, on the other hand, whilst the area planted may be less the acre yield should be greater, since it is generally admitted that the building up of the organic content of many soils, and of the Mallee soils in particular, is essential for maximum grain returns, and in this connection the development of satisfactory pastures will fit in well with the optimum cropping rotation for the district.

IMPORTANCE OF GRASS PRODUCTS.

Considerable development in the grasslands may therefore be anticipated in the future, but even to-day pastures contribute very largely toward the monetary wealth of the State. Examination of the statistics dealing with overseas exports shows that for the five-year period 1928-1932 produce to the value of £13,922,410 has been shipped annually. Of this amount £4,339,984 or 34 per cent. represents wheat and cereal products, £3,668,700 or 26 per cent. grassland products, £3,515,073, or 25 per cent. mining products, and £1,998,653 or 15 per cent. vineyard, orchard, and other products.

However, whilst South Australia is credited with exporting mining products to the above value the great bulk of the material included under this section is obtained from Broken Hill, and is not directly produced in this State. Therefore, if only South Australian products are taken into consideration about 46 per cent. of the total value of our overseas exports is derived from wheat, and approximately 35 per cent. from the grasslands.

From the foregoing particulars it will be realised that the grazing areas are of great importance to South Australia, and any experimental work indicating lines of improvement and profitable extension will result in appreciably increasing the general wealth of the community.

RAINFALL BELTS IN SOUTH AUSTRALIA.

Over large areas of South Australia the mean rainfall recorded is the limiting factor so far as the establishing of pastures is concerned, and in the table following, the areas receiving varying amounts of rain are shown.

Average Annual Rainfall.	Square Miles.
Over 40in.	96
30-40in.	1,036
25-30in.	3,258
20-25in.	8,620
15-20in.	19,940
10-15in.	36,460
Under 10in.	310,660
Total area	380,070

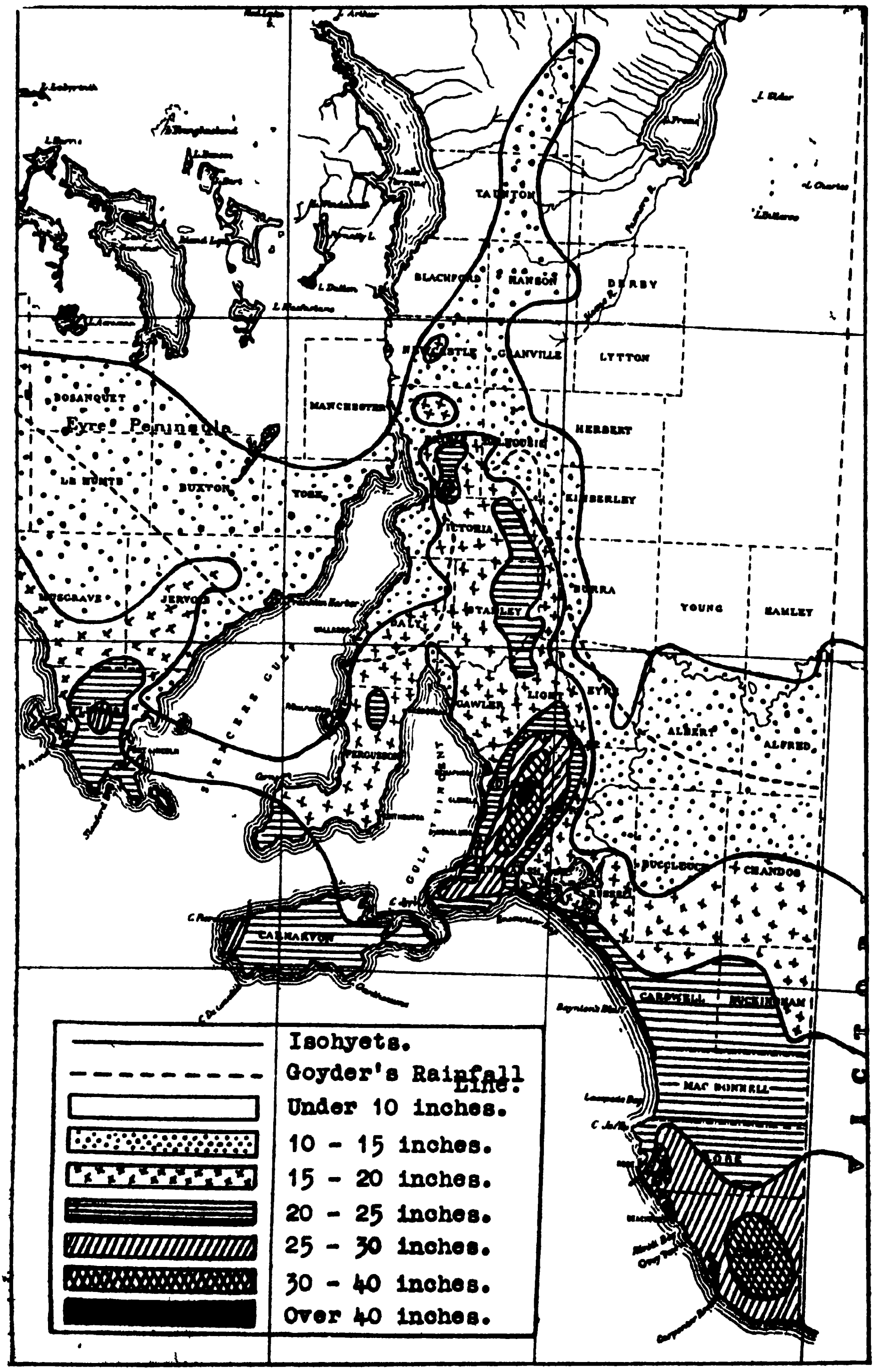
It will be noted that in this State 347,120 square miles of land receive less than 15in. of rain annually. This represents approximately 91 per cent. of the total, leaving only about 9 per cent. with which from a pasture point of view we are mainly concerned. On the other hand, however, 9 per cent. of the total area of South Australia equals nearly 22 million acres, and therefore there is considerable scope for pasture improvement. Included in this area of 22 million acres is wheat-growing land, vineyards, orchards, &c., with the result that only about one-third can be regarded as essentially grassland country. Over the balance pastures will be associated with the cultivation of other crops, and consequently be of a more or less temporary nature. The accompanying map on page — will show where these varying rainfall areas are situated.

The area of maximum rainfall is situated within the vicinity of Mount Lofty, reaching as high as 47.08in. at Stirling West, whilst over the adjoining areas of the Mount Lofty Ranges and the land surrounding Mount Gambier and Glencoe in the South-East the mean fall exceeds 30in. per annum. The 25 to 30in. belt covers the greater portion of the lower South-East, together with the boundaries of the Adelaide Hills and isolated spots at Green Patch on Eyre's Peninsula and Mount Remarkable in the North. The 20-25in. area includes practically all of the upper South-East, the lower levels of the Adelaide Hills, Kangaroo Island, and Southern Eyre's Peninsula, whilst as we get further inland, and therefore away from the westerly winds which strike the southern shores, so does the annual fall become less and less, until in the far-distant portions of the State a mean fall of less than 10in. of rain per annum is recorded.

THE POSITION OF NATIVE PASTURE PLANTS.

Since these are the natural conditions of the country it may be asked are there not native pasture species which could be isolated and utilised to advantage? It would appear reasonable to expect that plants which had developed and flourished under these conditions of soil and climate would respond to grassland management. However, on the whole, that does not appear to be the case, mainly because of the vastly different grazing conditions occurring at the present time comparatively with those obtaining prior to this land being inhabited by white men. In those days Australian herbivorous animals were neither particularly numerous nor very heavy grazers, with the result that the native vegetation was rarely severely checked. However, with the introduction of sheep, cattle, &c., and particularly the infestation of the country with hard-grazing vermin such as rabbits, the plant life was subjected to intense depasturing conditions for which it was not specially fitted. The result has been that a number of useful indigenous varieties have practically disappeared, whilst so far as cultivated pastures are concerned very few of the remainder exhibit marked promise. It may be that in the course of time special strains of Wallaby Grass, Saltbush, &c., will be isolated which will fill the requirements of certain localities, but it would appear that in the main we must look to successful introductions together with selections of desirable types from within these introductions for improvement in the pasture species available for planting on the grasslands of South Australia. Such being the case it is

necessary to examine the climatic conditions of the State and determine what types are likely to be of value to us, that is to say, can the best varieties of the chief grass-producing countries of the world be utilised, or will we be largely dependent upon our own efforts for building up satisfactory strains of pasture?



METEOROLOGICAL CONDITIONS.

Tables showing the mean monthly rainfall and temperature at various places in South Australia comparatively with those obtained at various stations in England and New Zealand.

C

RAINFALL.

Station.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
South Australia—													
Stirling West	1·49	1·22	1·80	3·57	5·63	8·06	6·28	6·29	5·09	3·72	2·07	1·86	47·08
Echunga	1·05	0·92	1·44	2·50	4·14	5·25	4·24	4·26	3·84	2·82	1·55	1·29	33·30
Mount Gambier	1·32	1·08	1·43	2·32	3·45	4·01	4·08	3·89	3·07	2·45	1·73	1·62	30·45
Yankalilla	0·56	0·78	1·19	1·60	2·96	3·83	3·14	2·71	2·52	1·64	1·04	0·86	22·83
Adelaide	0·72	0·73	1·02	1·73	2·76	3·11	2·65	2·52	2·07	1·72	1·12	1·00	21·15
Roseworthy	0·70	0·58	0·81	1·38	1·91	2·45	1·95	2·15	1·97	1·65	0·99	0·86	17·40
Lameroo	0·53	0·81	0·81	1·02	1·89	1·96	1·63	1·90	2·09	1·45	0·95	0·93	15·97
Port Augusta	0·51	0·52	0·72	0·76	1·11	1·16	0·72	0·89	0·93	0·84	0·68	0·60	9·44
New Zealand—													
Auckland	2·67	3·05	3·02	3·43	4·63	4·92	4·95	4·22	3·64	3·69	3·32	2·90	44·44
Wellington	3·30	3·19	3·29	3·80	4·76	4·87	5·55	4·43	3·99	4·19	3·44	3·30	48·11
England—													
Brecknock (Wales)	4·73	3·84	4·29	2·67	2·65	2·76	3·46	4·44	3·09	5·13	4·86	6·11	48·03
Carmarthen (Wales)	4·38	3·70	3·80	2·74	2·76	2·87	3·51	4·65	3·46	5·71	4·98	5·74	48·30
Tunbridge Wells (Kent)	2·21	2·03	2·16	1·57	1·59	1·86	1·97	2·21	2·00	3·35	3·03	3·02	27·00
Kew (Kent)	1·76	1·54	1·69	1·45	1·72	2·15	2·17	2·24	1·87	2·70	2·22	2·29	23·80

MEAN TEMPERATURES.

Station.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Stirling West	64·9	65·7	60·4	55·6	51·1	46·7	44·8	46·7	50·0	53·9	58·4	62·0	55·0
Adelaide	73·8	74·0	69·8	63·9	58·0	53·5	51·8	53·9	57·2	61·9	67·0	71·1	63·0
Port Augusta	77·5	78·3	73·4	66·7	59·9	54·8	53·0	55·8	60·5	66·8	72·0	75·8	66·2
Auckland	66·5	67·0	64·9	61·2	56·8	53·5	51·7	52·2	54·6	57·2	60·3	63·9	59·1
Wellington	62·5	62·5	60·5	57·0	52·7	49·4	47·7	48·6	51·6	54·4	56·9	60·4	55·4
Brecknock	38·0	38·2	40·2	44·4	49·5	55·5	58·5	57·6	53·4	48·0	41·4	39·1	47·0
Tunbridge Wells	38·7	39·1	42·3	46·3	53·3	57·3	61·1	60·8	57·1	50·3	43·3	39·9	49·2
Kew	40·4	40·7	43·2	47·1	54·5	59·0	62·8	61·7	57·3	50·9	43·5	41·4	50·2

The South Australian stations included in the foregoing table illustrate the climatological conditions in different portions of the State.

The rainfall in England also varies within wide limits, that for much of the eastern coast beng less than 25in. per annum, whilst parts of the western areas average almost 100in.

Kent is situated in the south-eastern corner, and as this is a county with a fairly light rainfall the details recorded show the conditions for an area which in England is regarded as relatively dry.

On the other hand, the rainfall in Wales varies between 26in. at Flint to 97in. at Merioneth, but the two stations given represent a fair average for that municipality, and the conditions may be regarded as more or less typical both in respect to annual rainfall and mean temperature. They may also be accepted as being very similar to those obtaining in the chief grassland areas of England. In the same way the data recorded for Wellington and Auckland represent average conditions for the good pasture areas of New Zealand.

Examination of the rainfall figures indicates that the monthly falls at the stations shown for England and New Zealand are much more regular than those received at the South Australian stations. For example, if three centres with approximately equal annual rainfall, namely, Stirling West, 47.08in.; Wellington (N.Z.), 48.11in.; and Brecknock (Wales), 48.03in. are compared, it will be noted that at the first-named station the extremes are 1.22in. for Februray, and 8.06in. for June; for Wellington, 3.69in. for January, and 5.55in. for July; and for Brecknock 2.65in. in May, and 5.13in. in September.

Therefore, even in the highest rainfall district in South Australia pastures are subjected to monthly periods of much lower rainfall conditions than those in the average grassland areas of England and New Zealand. But more than this, in South Australia these droughty conditions extend over several months of the year, and at Stirling West the six-monthly period of May to October only shows a mean fall of 12.03in. or 26 per cent. of the total, whereas at Wellington for the same period 20.32in. is recorded, or 42 per cent. of the mean annual fall, whilst corresponding figures for Brecknock are 19.07in. and 40 per cent. respectively.

In the matter of mean temperatures the differences between the readings of the wetter districts of South Australia and those obtained at the New Zealand stations are not appreciable, but at the same time the periods of low temperature and heavy rainfall, or high temperature with low rainfall, occur to a much greater degree in this State than in New Zealand.

So far as England is concerned South Australia is considerably warmer, whilst within the State the mean temperature increases as the annual rainfall becomes less or according to the distance inland that the area is situated.

EFFECT OF CLIMATE ON PLANTS.

From the preceding discussion it is evident that South Australia must be included in the group of countries which enjoy what is known as a "Mediterranean type" of climate, and as these countries have not had extensive experience in the development of valuable pasture species such work in South Australia is made correspondingly more difficult.

With a "Mediterranean type" climate, that is to say, where the period of winter rainfall and low temperatures alternates with summer drought and high temperatures, perennial pasture plants must be able to exist for a considerable length of time during which evaporation will be very great and the rainfall almost negligible. On the other hand, in the chief pasture lands of Great Britain and New Zealand the rainfall is high enough and well enough distributed throughout the year to produce abundant crops of grass, whilst moreover such production is assisted by the mildness of the climate and humidity of the atmosphere.

The more important native grasses of Australia are perennials, but the introduction of fodders with improved grazing capacities means that such plants expose increased leaf growth to evaporation, and therefore lose a greater supply of moisture. The consequence is that unless the species or strain possesses a particularly extensive root system and drought-resisting habits it rapidly succumbs to the conditions.

Whilst there are certainly some areas in South Australia where high rainfall, coupled with location and moisture supplies, soil fertility, &c., render the conditions favourable for the planting of the chief pasture varieties of the world, yet on the whole these areas are relatively small, and it would appear that the development of special types whether they be perennials or annuals is necessary in the same way as plant breeders have had to evolve cereal varieties able to meet the varying soil and climatic conditions of Australia. This fact has been realised for a considerable time, and throughout the Commonwealth much work has already been done in the introduction and testing of both perennial and free seeding annual pasture plants.

There is another aspect of pasture improvement which of late years has received appreciable attention, and that is the selection and development of pasture strains. As a rule within each pasture species there exists a considerable variation in type, and it is possible that amongst these variations there may be some which are specially suited to particular soil and climatic conditions, yield a greater quantity of leaf, are more persistent, possess superior re-seeding habits or other desirable characters, thus, from a pasture point of view, making such strains superior to the other types included in the species.

It is the work of the agrostologist and experimentalist to isolate these strains, test them out in various localities, and ascertain their value for special conditions.

CHOICE OF PASTURE SPECIES AND STRAINS.

In connection with the question of planting pasture species it is necessary to consider whether it is possible to secure varieties which given normal climatic conditions and efficient management will economically supply a greater quantity of fodder than the spontaneous herbage which naturally springs up.

However, so far as the latter is concerned, it should be remembered that it includes many varieties which have been accidentally introduced from countries possessing somewhat similar climatic conditions. Weeds imported in this way which are widespread throughout the State are Burr Medic (or Burr Clover as it is frequently termed), Barley Grass, Geranium, Cat's Ear, and many others of lesser grazing value. Consequently, any new variety must be tested to determine its relative importance for the widely differing soil and climatic conditions which exist in South Australia.

Much has been done in the past, and of recent years upwards of 60 trials including pasture varieties have been conducted in various districts extending from Upper Eyre's Peninsula to the Lower South-East. In these tests many varieties have been shown to be quite unsuitable, some must be regarded as unproven, whilst a few have definitely established themselves as valuable pasture types for different conditions in the State. It is with this latter group that the practical man is mainly concerned, and therefore it is only proposed to discuss those varieties which have been definitely proved to have value and can be confidently recommended for planting. There are a number of others which are still in the experimental stage, whilst work in the way of introducing and the testing of strains is still in progress.

SUBTERRANEAN CLOVER (*Trifolioum subterraneum*).

This is far and away the best clover for general planting in South Australia. In fact, because of its ability to provide an abundance of fodder and at the same time act as a soil renovator it must be regarded as the most important

pasture plant in this State. Much poor land has been built up by the encouragement of heavy crops of Subterranean Clover until in the course of time the soil has become so improved in fertility that the introduction of other grasses to make a better pasture mixture is rendered possible. The foregoing statements could only be submitted if the characteristics of Subterranean Clover fitted in well with the rainfall and climatic conditions which obtain over large areas of the State. This is the case, as being an annual it does not have to struggle for existence during the period of high temperatures and low rainfall, but given efficient management, and when planted in favourable districts sets its seed in early summer, thus making provision for carrying on in the following year. These seeds are buried underground, and therefore the plant is practically permanent in nature. Further, the grain is large in size allowing for relatively strong early growth after germination in the following autumn.

One of the chief advantages of this clover is the fact that it can be economically established—a most important point in the development of new country and relatively low yielding pasture areas. The soil preparation does not necessarily have to be complete, whilst it will withstand competition, and in a number of cases has been successfully seeded in conjunction with another crop. Subterranean Clover will naturally respond to good soil tillage, but provided that the seed is covered by some means or other good stands have been established with comparatively little soil preparation.

So far as soils are concerned Subterranean Clover thrives in practically all classes, the only exception in the series of experimental plots being at Hatherleigh in the South-East where the plants failed to develop on heavy black soil which contained an appreciable amount of lime. Other landowners have experienced similar results in this class of country, but as clovers such as Strawberry respond to these conditions the area apparently unsuitable for Subterranean Clover is not particularly important.

The credit of developing and demonstrating the value of this clover, which occupies such an important position in the pasture world of the Commonwealth, is due to the late Mr. A. W. Howard, of Mount Barker. Whilst it is regarded as more or less a weed in Southern Europe, where it originated, Mr. Howard took it in hand some 30 years ago, and to-day it may be classed as the most important fodder plant in this State, if not in Australia.

The strain built up by Mr. Howard and generally planted throughout the Adelaide Hills and the South-Eastern areas is a succulent, leafy, high fodder-producing type, which requires mild and moist early summer conditions for full development of its seed. Consequently, it is not persistent in districts where dry weather and high temperatures are regularly experienced in early summer. Under such conditions the plants fail to set seed and quickly disappear. As a result the annual rainfall limit for this variety is 22in., although where the locality enjoys cool weather during November and early December this amount may be reduced to approximately 20in. per annum.

However, of recent years other strains possessing earlier ripening characteristics have been developed, and to-day seed of a variety known as Dwalganup Subterranean Clover has been placed on the market. This strain originated in Western Australia. Seed has been imported to this State and planted at a number of centres. From the results obtained it appears likely to prove valuable in districts receiving as little as 16in. of rain annually. On sandy soil at Narrung, in the Lakes district, where the rainfall recorded since the crop has been planted is less than 16in. per annum a really good mat of fodder has been secured. It is now three years since the plot was seeded, and plants are appearing in various places over the remainder of the field where the grain has been carried by grazing animals.

Satisfactory results have also been obtained at Saddleworth, Eudunda, Keith, and other places where plots have been established, and it is therefore probable that this clover will occupy a definite place in the 16in. to 22in. rainfall areas of the State.

In addition to the strains of Subterranean Clover already on the market several others have been selected by different plant breeders, and at Kybybolite Experimental Farm seven strains in all are being seeded in small plots for comparative purposes.

However, provided that the climatic conditions will permit of the planting of the Mount Barker strain there is no reason for departing from this type. Lack of leaf development proportionately to the amount of stem appears to be a characteristic associated with early maturity of Subterranean Clover, and therefore the later ripening strain is definitely superior from a fodder point of view.

Subterranean Clover is therefore recommended for general planting in all the wetter pasture areas of the State, and the Dwalganup strain for other districts in which the rainfall is not less than 16in. to 17in. per annum.

However, in this connection there is one point which must be kept prominently in mind, namely, that full pasture returns cannot be anticipated unless adequate phosphatic manurial dressings are applied to the soil.

A promising Wimmera Rye Grass Selection.

WIMMERA RYE GRASS (*Lolium subulatum*).

Both Subterranean Clover and Wimmera Rye Grass are annuals, and are regarded as the most valuable pasture plants for average grassland conditions in South Australia.

In neither case were they considered of particular importance in their country of origin, and it remained for Australian workers to demonstrate their value for local conditions. It is recorded by Mullett (H. A. Mullett, *Journal of Agriculture*, Victoria, 1919) that the seed of the grass which is now known as Wimmera Rye Grass was imported from Europe by Mr. McNicholl, a Wimmera farmer, toward the end of last century. Apparently it was purchased as Italian Rye Grass, as it was known by that name for many years. On planting on Mr. McNicholl's farm the seeds made strong growth, and the plants were ultimately harvested. The grain so obtained was distributed throughout the district, and thus the grass became firmly established.

However, beyond spreading locally not much headway was made until about 1919, when the variety was definitely identified and given the name of Wimmera Rye Grass. Harvesting of seed became general, and it was distributed throughout Victoria and the other States. The Wimmera farmers had long recognised its grazing value, and when introduced into other districts its importance was quickly realised.

The outstanding features of the grass are hardiness, persistency, and palatability. It will thrive in practically all soils, and good stands have been established on poor, shotty, ironstone country, light sandy soil, and extending through the different classes to the rich volcanic soil in the vicinity of Mount Gambier.

In addition to the main pasture areas, Wimmera Rye Grass can be grown in all districts in which wheat is successfully cultivated, and possesses the advantage of being established at very little expense. The seed can be drilled in at the same time as the wheat, when the only additional cost would be approximately 1s. per acre for 2lbs. of Wimmera Rye Grass.

The original strain of Wimmera Rye Grass collected in the Appila district from which the selection in the preceding photo. was made.

On the pasture areas planting may be relatively rough, but in any case every effort should be made to bury the seed. Satisfactory grazing of this grass has been secured in districts with as low as 12in. of rain per annum, whilst at the same time it responds to wetter conditions.

Wimmera Rye Grass is most persistent in its efforts to produce seed, and so carry on in the following year. Except if very heavily overgrazed late in the growing season or inefficiently managed even very small plants will form seed heads close to the ground and produce grain.

As a rule it is eaten readily by stock when in either a green or dry state, but in this connection the variety should not be confused with Hard or Rigid Rye Grass which is common in some districts and of very little grazing value.

Considerable variation of type exists in Wimmera Rye Grass, some plants being much more leafy than others, and consequently of superior fodder value. Others possess heavy fibrous stems and a minimum amount of leaf, thus rendering them undesirable. There is therefore work for the plant breeder to do with this fodder, and at the present time that marketed as the McDougall strain is fairly satisfactory so far as good type plants are concerned. The Department has tackled the question of building up a superior and uniform Wimmera Rye Grass selection.

In 1932 individual good-type plants were collected from various districts, and the seed from these sown separately in the Pasture Strain Experimental Plots at Kybybolite. Throughout the series quite a variation in type and rate of maturity appeared, and from these variations a further selection was made. The results secured this season are very encouraging, and there is a possibility that one or two strains will ultimately prove of distinct value.

It is with the utmost confidence that Wimmera Rye Grass can be recommended for general planting throughout South Australia. In fact, with but rare exceptions, seed of this variety should be included in every pasture mixture sown. In this way the provision of a grass in the fodder crop is insured notwithstanding the character of the summer weather experienced.

PERENNIAL RYE GRASS (*Lolium perenne*).

The results obtained from the various plots have indicated that high rainfall, favoured situations, and good soil fertility are necessary for this fodder to be truly persistent. Unless such conditions exist the stand tends to rapidly thin out, and even if these natural advantages are available it is essential that seed possessing truly perennial habits should be planted. In some plots where uncertified seed was utilised the stand practically disappeared in the course of three years. This was because the strain was of the short-lived type, and unless it is certified the buyer is always liable to be supplied with poor seed. Therefore, although guaranteed seed may be a higher price per bushel it is much more economic than any other unless the type of plant in the crop from which the seed is harvested is known to the purchaser.

The best crops of Perennial Rye Grass have been obtained on the rich, dark-coloured pockets of soil in the Adelaide Hills and the black lands of the South-East. Where the soil and climatic conditions are favourable this grass possesses distinct advantages. Being a perennial it makes rapid growth in the early autumn, whilst it provides green picking throughout the summer should the rainfall conditions permit. Consequently, it is a very valuable pasture plant in the chief grasslands of the world, and is the most important grass in England and New Zealand, but in South Australia the areas favourable for its cultivation are relatively limited. However, it is possible that in the course of time some strain may be developed which is able to withstand severer weather conditions than the type now regularly planted. For example, there are small areas of Perennial Rye Grass situated in various places in the Adelaide Hills which have been established for many years, and which are capable of withstanding the periodic summer droughts experienced. It is possible that in this way regional strains of Perennial Rye Grass have developed which are specially suited to the local climate, and if seed were available the area over which the variety could be successfully planted would be considerably increased.

In order to provide information on this question seed has been collected from various sources and grown in comparison with the best New Zealand, Victorian, and English strains. Last year 14 strains of South Australian origin were selected for further observation, and in the course of time it is hoped to isolate a productive and persistent type which will prove satisfactory for planting on the better-class pasture land of the State. However, to-day the planting of Perennial Rye Grass can only be recommended under the most favourable conditions offering in South Australia, and if any doubt exists as to the suitability of the locality Wimmera Rye Grass should be substituted or in any case constitute portion of the grass seed mixture to be planted.

PHALARIS TUBEROSA.

Phalaris tuberosa has proved the most drought resistant of the perennial grasses included in the trials. It has survived extremely dry and hot summer conditions in many districts, and although exhibiting very limited above-ground growth at the end of summer, the plants have invariably made rapid development following

the autumn rains and provided a bulk of early feed. This variety of grass, therefore, has distinct possibilities, but there is one important feature in connection with its cultivation which must be emphasised, namely, that the young plants are very susceptible to competition in the first few weeks of their existence. Consequently, proper soil preparation is absolutely essential for a good stand. Weeds or other strong-growing pasture varieties are likely to crowd out the weakly *Phalaris tuberosa* plants, but on the other hand as soon as the root system of these plants is developed they become markedly resistant to such competition.

The best results have been obtained by sowing the *Phalaris* seed alone on well-prepared land, and in the following year adding Subterranean Clover to make a satisfactory pasture mixture. In some cases where the land has previously carried good Subterranean Clover crops sufficient seed remains despite the preparatory cultivation to provide the clover mixture in the second year, but the important point is to endeavour to give the *Phalaris tuberosa* plants every chance in the first month or so after germination.

The 17in. rainfall belt appears to be the limit for moisture, whilst it prefers heavier and more fertile soils to those of a sandier and lighter nature. Owing to the manner in which the crown expands the plant tends to crowd out other weeds and provided that precautions are taken in insuring favourable seeding conditions the cultivation of *Phalaris tuberosa* can be recommended for many areas in South Australia. When once established a stand including this pasture should be regarded as practically permanent, and therefore it is not suitable for planting in a short-term rotation on a wheatgrowing farm. On the other hand, in some of the wheatgrowing areas its drought-resistant qualities render *Phalaris tuberosa* useful for seeding in the grazing fields.

LUCERNE (*Medicago saliva*).

So far as Lucerne is concerned, in this report it is regarded as a purely grazing crop. It is a fodder which has given really good results in many districts whilst there is still room for expansion over much wider areas in South Australia. Its wonderful root system renders Lucerne extremely drought-resistant, and some thousands of acres have been successfully seeded in the Mallee areas of the State where the annual rainfall is approximately 15in. per annum.

Another advantage for such conditions is the fact that it can be readily seeded with the wheat crop and dressings as low as 2lbs. to 3lbs. of seed per acre have yielded satisfactory grazing. However, as a rule better results have been secured where Lucerne has been sown alone, although in land which tends to drift a cover crop is necessary.

Lucerne is one of the best pasture plants for the wheatgrowing areas of South Australia, whilst it is the chief pasture variety for the sandy land of the Lakes District. It is a crop demanding certain requirements of soil and drainage, with the result that it cannot be generally grown throughout the Adelaide Hills and South-East. Lucerne can only make satisfactory growth on land which is well drained and contains ample supplies of lime. Therefore, these requirements must be kept in mind when planting is being considered, and soils which become saturated for relatively long periods or overlie an impervious raw clay subsoil should not be seeded with Lucerne.

WHITE CLOVER (*Trifolium repens*).

So far as the soils and climate of South Australia are concerned White Clover may be placed in the same category as Perennial Rye Grass. Where conditions permit of its successful cultivation White Clover makes an excellent perennial pasture plant, but unless the prospects are favourable for satisfactory growth it is better to sow Subterranean Clover in preference to this variety. Another factor militating against White Clover is the prevalence of lucerne flea in the moister

localities, as these pests attack the smooth-leaved legumes much more readily than those with hairy leaves, and consequently tend to destroy young White Clover plants. There are several strains of White Clover on the market, the best type appearing to be the New Zealand Certified, but except for limited areas and irrigated lands the seeding of White Clover cannot be recommended in South Australia.

OTHER VARIETIES AND CONCLUSION.

Among the other pasture plants which under special circumstances have yielded satisfactory grazing are Cocksfoot, Strawberry Clover, Clustered Clover, Primrose, Wallaby Grass, King Island Melilot, Creeping Saltbush, &c. However, from the point of view of the grasslands of the State as a whole, none of these is very important.

Consequently, when it is proposed to sow down a pasture field the varieties which have been discussed should be the first considered, since experience has shown that they will respond to the conditions stated. From time to time new fodder varieties are widely advertised, and their valuable qualities prominently set forth, but until their importance under local conditions has been fully demonstrated by comparative trials, purchase of seed or plants for other than a small experimental plot is not recommended.

It is unwise to depart from the proved types, and prospective planters of pastures in this State should rely upon the tested varieties, particularly Subterranean Clover and Wimmera Rye Grass, which have shown to advantage in numerous trials extending throughout many districts in South Australia, and leave the search for superior types to the Commonwealth and State officers directly associated with pasture improvement experiments.

ANNUAL REPORT ON PASTURE WORK, KYBYBOLITE, 1933-34.

[By L. J. Cook, R.D.A., Manager

(*Continued from page* 596.)

SOWN PASTURES—SUBTERRANEAN CLOVER AND WIMMERA RYE GRASS.

The 15 plots of this pasture mixture established during 1924 are being maintained and fully grazed each season. This year they were again grazed in rotation, using 245 ewes including 52 aged half-breds, 62 Comebacks (1929 drop), 50 Comebacks (1930 drop), 48 Comebacks (1931 drop), and 33 Comebacks (1932 drop). They were proportionately divided into four flocks on the 65 acres of manured plots, and grazing has been continuous on the plots for the whole season 1933-34.

Table 7 shows the fertiliser given to various plots with the rate and time of application, and Table 8 shows the grazing results for the past nine years.

Table 7.—*Fertilising of Subterranean Clover and Wimmera Rye Grass Pasture Test, Kybybolite,* 1923-34.

Plot.	Fertiliser Per Acre.	Date of Application
9	No Manure (check plot)	—
1	1cwt. Tetraphosphate	Annually, 1923-29
2	5cwts. Tetraphosphate	One application 1923
	78lbs. 105% Triple Phosphate	One application 1931
10	4cwts. 82% Island Rock Phosphate	One application, 1924
	4cwts. 82% Island Rock Phosphate	One application, 1929
11	1cwt. 45% Superphosphate	One application, 1924
	4cwts. 82% Island Rock Phosphate	One application, 1924
14	1cwt. 45% Superphosphate	One application, 1924
	6cwts. 33% Bone Manure	One application, 1924
13	37lbs. 90% Potash	Annually, 1924-33
	4cwts. 82% Island Rock Phosphate	One application, 1924
	4cwts. 82% Island Rock Phosphate	One application, 1929
12	37lbs. 90% Potash	Annually, 1924-33
6	45lbs. 45% Superphosphate	Annually, 1927-33
4	90lbs. 45% Superphosphate	Annually, 1923-33
15	112lbs. 45% Superphosphate	Annually, 1924-33
5	5cwts. 36% Superphosphate	One application, 1923
	180lbs. 45% Superphosphate	Annually, 1928-33
3	10cwts. Lime	One application, 1923
	1cwt. Tetraphosphate	Annually, 1923-27
	1 ton gypsum	One application, 1928
	1cwt. 45% Superphosphate	Annually, 1928-33
7	1 ton Lime	One application, 1924
	1cwt. 45% Superphosphate	Annually, 1924-33
8	6cwts. 61% Ephos Phosphate	One application, 1924

TABLE 8.—*Returns of Subterranean Clover and Wimmera Rye Grass Grazing Test, Kybybolite,* 1925-34.

Year.	Grazing in Sheep Per Acre.														
	Check Plot No. 9.	No. 1.	No. 2.	Rock Phosphate Plots.			Potash Plots.		Superphosphate Plots.				Lime Gypsum. and Super Plots.		
				No. 10.	No. 11	No. 14.	No. 13.	No. 12.	No. 6.	No 4.	No. 15.	No. 5.	No. 3.	No. 7.	No. 8.
1925-26	2·13	2·76	2·76	3·02	3·62	3·13	3·27	2·60	1·81	3·12	3·51	3·06	2·47	3·04	3·32
1926-27	1·95	3·53	3·15	3·79	3·68	2·68	3 69	2·68	1·88	3·72	4·14	3·21	2·97	3·70	3·95
1927-28	1·94	2·15	2·10	3·01	3·76	3·07	3·40	1·99	2·70	3·05	3·71	2·06	2·63	3·28	3·92
1928-29	1·20	2·89	2·66	2·49	3·88	2·98	3·62	2·25	2·73	3·90	4·05	4·35	4·27	3·96	3·75
1929-30	1·16	3·25	2·89	2·75	2·70	2·67	3·34	2·13	2·55	4·52	4·32	5·37	4·40	4·52	3·77
1930-31	1·27	2·71	2·22	2·76	3·82	2·26	3·04	2·47	3·53	4·30	2·91	5·29	4·79	5·24	5·09
1931-32	0·88	3·55	2·99	3·37	2·56	2·62	3·90	2·03	2·58	4·86	4·53	4·77	5·18	5·47	4·14
1932-33	1·22	3·43	3·06	3·26	4·09	2·75	4·05	2·40	3·14	4·52	4·84	5·13	4·63	5·68	4·05
1933-34	0·94	3·86	3·75	3·86	3·64	3·03	4·72	2·17	4·30	6·48	4·71	6·11	5·09	5·84	3·85
Means—															
1925-34	1·41	3·13	2·84	3·15	3·53	2·80	3·67	2·30	2·80	4·27	4·08	4·37	4·05	4·53	3·98
1928-34	1·11	3·28	2·93	3·08	3·45	2·72	3·78	2·24	3·14	4·76	4·23	5·17	4·73	5·12	4·11
					3·08					4·32				4·65	
Increase over no manure .		2·17	1·82	1·97	2·34	1·61	2·67	1·13	2·03	3·65	3·12	4·06	3·62	4·01	3·00
					1·97					3·21				3·55	
Increase over rock phosphate		—	—		—		0·70	—	0·06	1·68	1·15	2·09	1·65	2 04	1·03
										1·24				1·57	
Increase over superphosphate		—	—		—		—	—		—			*0·41	0·80	—
														0·33	
Increase over potash ...		1·04	0 69	0·84	1·21	0·48	1·54	—	0·90	2·52	1·99	2·93	2·49	2·88	1·87
					0 84					2·08				2·41	

These results show that Subterranean clover pasture that has been receiving continued applications of phosphatic fertiliser is increasing its carrying capacity annually. For the past seven seasons the average number of sheep carried over all the plots has shown a steady increase from 2.88 per acre in 1927 to 4.11 in 1933, and the average for nine years has been 3.38 per acre. This latter figure is one sheep better than the average carrying capacity of 2.39 sheep per acre, secured from well fertilised natural pasture previously discussed.

Considering the individual plots, No. 4, dressed with 90lbs. 45 per cent. superphosphate annually, has had a very productive season, carrying approximately 6½ sheep per acre for the season, and is the highest return from any plot during the nine-year period. Plot No. 5, dressed with 180lbs. 45 per cent. superphosphate annually, also exceeded six sheep per acre for this season, and No. 7, dressed with lime and superphosphate carried 5.84 sheep, which is also the greatest return received from this plot. Twelve of the 15 plots during this season exceeded their average carrying capacity. The three plots that failed to do so were No. 9 (no manure plot), No. 12 (dressed only with potash), and No. 8 (dressed with Ephos phosphate nine years ago).

For the nine years Plot No. 7 (lime and superphosphate) has been the most productive with 4.53 sheep per acre per annum, and No. 5 (heaviest dressed superphosphate plot) is second in productivity with 4.37 sheep,

closely followed by No. 4 (90lbs. superphosphate) with 4.27 sheep. Plots No. 15 (1cwt. superphosphate) and No. 3 (gypsum and superphosphate) have also exceeded four sheep per acre per annum.

For the immediate past six years, however, Plot No. 5 (180lbs. superphosphate) has yielded greatest return with 5.17 sheep per acre per annum, very closely followed by No. 7 (lime and superphosphate) with 5.12 sheep. For the same period No. 4 (90lbs. superphosphate) has carried 4.76, No. 3 (gypsum and superphosphate) 4.73, No. 15 (1cwt. superphosphate) 4.23, and No. 8 (Ephos phosphate) 4.11 sheep.

As a comparison of the quantity of superphosphate test Table 9 shows the results from 180, 90, and 45lbs. dressings compared with no manure:—

TABLE 9.—*Superphosphate quantity Test on Subterranean Clover and Wimmera Rye Grass*, 1928-33.

Plot.	Sheep Carried per Acre.	Increase over no Manure.	Cost of Fertiliser per Acre.	Cost of Fertiliser per Sheep.	Value of Increased Grazing at 15s. per Sheep.	Profit per Acre per Annum due to Fertiliser.
Super—			s. d.	s. d.	s. d.	s. d.
No. 5 180lbs.	5·17	4·06	9 4	2 4	60 11	51 7
No. 4 90lbs.	4·76	3·65	4 11	1 4	54 9	49 10
No. 6 45lbs.	3·14	2·03	2 8	1 4	30 5	27 9
No. 9 No manure .	1·11	—	—	—	—	—

These results are the average annual returns over six consecutive seasons, and indicate the value to be obtained from the use of superphosphate on a sown pasture of Subterranean clover and Wimmera Rye grass, combined with systematic rotational grazing. For this grazing the fertilised plots have been fed off monthly in rotation with approximately 16 sheep per acre, whilst the unfertilised plot was grazed monthly with approximately three sheep per acre. The table shows that when sheep are valued at 15s. each per annum the increased return per acre per annum due to the fertiliser has been 51s. 7d. from the 180lbs. dressing, 49s. 10d. from the 90lbs. dressing, and only 27s. 9d. from the 45lbs. application. It appears that the 90lbs. annual application is very suitable and economical under local conditions.

Referring further to Table 8, the averages for the nine seasons show clearly that lime and superphosphate are the most productive of the fertilisers tried. The two combined have given the greatest yield, whilst superphosphate on its own has yielded almost as well in quantity of feed. Lime has an advantage, however, in producing quicker early feed, and more during the colder months of the year.

Summarily the average results of the principal plots for the past six years are compared in Table 10 in order of productivity and value.

TABLE 10.

Kind and Rate of Fertiliser.	Annual Cost of Ferti-liser.	Sheep per Acre Carried.	Increase above no manure.		Value at 15s. per Sheep.	Profit per Acre per Annum due to Ferti-liser.
			Sheep per Acre.	Per-centage.		
	s. d.	%	%	%	s. d.	s. d.
1 Annual dressing 180lbs. 45% Super.	9 4	5·17	4·06	366	60 11	51 7
2 Annual dressing 90lbs. 45% Super.	4 11	4·76	3·65	329	54 9	49 10
3 Single dressing 1 ton Lime and annual dressing 1cwt. 45% Super.	11 0	5·12	4·01	361	60 2	49 2
4 Single dressing 1 ton Gypsum and annual dressing 1cwt. 45% Super.	10 9	4·73	3·62	326	54 4	43 7
5 Single dressing 6cwts. Ephos Phosphate	3 9	4·11	3·00	270	45 0	41 3
6 Annual dressing 1cwt. 45% Super.	6 0	4·23	3·12	281	46 10	40 10
7 Single dressing 4cwts. Rock Phosphate and 1cwt. 45% Super.	2 9	3·45	2·34	211	35 1	32 4
8 Dressing 4cwts. Rock Phosphate every five years and annual dressing 37lbs. Potash	9 8	3·78	2·67	241	40 0	30 4
9 Annual dressing 45lbs. 45% Super.	2 8	3·14	2·03	183	30 5	27 9
10 Dressing 4cwts. Rock Phosphate every five years	4 2	3·08	1·97	177	29 7	25 5
11 Annual dressing 37lbs. Potash (90%)	5 6	2·24	1·13	102	16 11	11 5

With reference to the variety of growths now appearing on these plots monthly estimations were taken throughout the growing period of the season by reading six indiscriminate quadrat sections on each plot. The following table shows the average percentage of annual grasses, Subterranean clover, Cape weed, thistles, &c., on the various series of fertilised plots taken during the seven months of growing pasture.

TABLE 11.—*Botanical Analysis of Clover Pasture Plots, Kybybolite,* 1933.

Species.	Rock Phos-phate Plots.	Super. Plots.	Gypsum Super. Plot.	Lime and Super. Plot.	Ephos Phos-phate Plot.	Potash Plot.	Average all Phos-phate Plots.	Check No Manure Plot.
	%	%	%	%	%	%	%	%
Grasses	31·5	43·11	50·94	60·69	34·62	30·59	40·81	14·77
Clover (Subt.)	65 69	53·53	46·41	26·43	55·94	61·18	54·48	79·40
Thistles	0·20	0·23	1·09	8·21	0·47	—	1·14	Trace
Cape weed	0·16	0·80	0·24	1·67	7·27	—	1·17	Trace
Miscellaneous	0·99	1·64	0·96	2·73	0·60	4·56	1·49	1·41
Bare Space	1·46	0·68	0·36	0·27	1·10	3·67	0·90	4·41

In making the estimation of pasture plants no attempt was made to separate the various species of grasses. The grasses consisted wholly of annual types, principally Barley grass, with some Wimmera Rye, Silver, and Sterile Brome grasses. Wimmera Rye was not much in evidence, providing not more than 5 per cent. of the pasture on the best plots.

An interesting factor shown by the above table is the variation of amount of grass to clover in the different manurings. The percentage

of grass is highest on the lime and superphosphate plot with 60.7 per cent., and next highest on gypsum and superphosphate plot (50.9 per cent.). The same pasture fertilised with superphosphate only has yielded 43.1 per cent. of grass, and significantly the plot with the heaviest dressing of superphosphate has yielded the heaviest proportion of grass—180lbs. dressing shows 47 per cent. grass, 90lbs. dressing shows 45 per cent., and 45lbs. dressing shows 43 per cent.

When fertilised with acid soluble phosphate the percentage of grass shows at 31.5, fertilised with potash only 30.6 per cent., fertilised with both potash and acid soluble phosphate 35.7 per cent., whilst on unmanured pasture the percentage of grass has only been 14.8.

The percentage of Subterranean clover on the plots has been reversed being only 26.4 per cent. of the pasture on the lime and superphosphate plot, and 79.4 per cent. of the pasture on the unfertilised plot. It is necessary to state that these plots were established on old cultivated land in 1924, and consequently there was a certain residue of phosphate present on the check plot, which has enabled the Subterranean clover to persist throughout the 10-year period, and although it has made cover over the plot to the extent of 79.4 per cent., the clover has made scarcely any growth, and provided very little feed.

Thistles have appeared on most fertilised plots in comparatively small numbers, except on the lime and superphosphate plot, which contained over 8 per cent. thistles, principally of the Scotch and Slender varieties.

Cape weed was less consistent on the plots, and although the plot dressed with Ephos phosphate contained 7.27 per cent., and the one dressed with 1cwt. superphosphate contained 2.97 per cent., none of the others carried any appreciable quantity.

Miscellaneous plants were rather plentiful on plot No. 12, dressed with potash only, 4.56 per cent. of this pasture being designated miscellaneous, and consisted principally of rooted cat's ear.

Naturally the unmanured plot contained the greatest amount of bare space, namely 4.4 per cent., and this amount of bare space was reduced consecutively with the heavier dressings of fertiliser, no bare space being recorded at all on the plot dressed with 180lbs. superphosphate, and only 0.27 per cent. noted on the lime and superphosphate plot. The average amount of bare space for all plots fertilised with phosphate has been less than 1 per cent.

THE BREEDING OF ENGLISH LEICESTER-MERINO-COMEBACK LAMBS ON SUBTERRANEAN CLOVER AND WIMMERA RYE GRASS PASTURE.

For the past five seasons separate flocks of ewes have been grazed on the different series of fertilised plots, and careful records kept of the lambs produced. The flocks used on these plots this season were constituted as follows:—

	Aged. Halfbreds.	Comebacks. 1929. Drop.	1930. Drop.	1931. Drop.	1932. Drop.	Total.
Flock E, grazed on plots Nos. 4, 5, 6, 15, fertilised with superphosphate only ..	15	19	15	15	10	74
Flock I, grazed on plots Nos. 3, 7, 8 fertilised with lime, or gypsum, and superphosphate	13	17	13	13	9	65
Flock G, grazed on plots Nos. 10, 11, 13, fertilised with rock phosphate	11	13	11	11	7	53

All of the above ewes, excepting the aged half-breds, were born and reared on their respective plots, and are daughters of these half-bred English Leicester x Merino ewes by Merino rams. They have known no other type of feed throughout their life.

Table 12 shows the percentage of lambs marked for the immediate past five seasons from these three flocks, and includes also for comparative purposes the results from Flock KI, similarly constituted of 1929, 1930, 1931, and 1932 Comeback ewes, but grazed on fertilised natural pasture.

TABLE 12.—*Lambing Percentages of English Leicester-Merino Ewes x with Merino Rams,* 1929-33.

Flocks of Ewes.	Lambs Marked.					Average.		
	1929.	1930.	1931.	1932.	1933.			
	%	%	%	%	%	%		
E—Aged ewes	90	137	106	117	120	114		
E—Ewes born, 1929	—	—	80	85	105	90		
E—Ewes born, 1930	—	—	—	80	87	84	85	92
E—Ewes born, 1931	—	—	—	—	80	80		
I—Aged Ewes	111	137	124	119	100	118		
I—Ewes born, 1929	—	—	76	65	106	82		
I—Ewes born, 1930	—	—	—	85	100	93	77	86
I—Ewes born, 1931	—	—	—	—	54	54		
G—Aged Ewes	111	144	114	108	90	113		
G—Ewes born, 1929	—	—	69	86	108	88		
G—Ewes born, 1930	—	—	—	100	73	87	83	90
G—Ewes born, 1931	—	—	—	—	73	73		
KI—Ewes born, 1929	—	—	50	75	118	81		
KI—Ewes born, 1930	—	—	—	75	—	38	67	
KI—Ewes born, 1931	—	—	—	—	62	62		

The lambs were sired by Merino rams, and the percentages are satisfactory, this season's results comparing favourably with previous years. For the five years under review it is interesting to note that the aged half-bred ewes in Flocks E, I, and G have averaged 115 per cent. of lambs per season, but there has been no marked differences between the individual flocks on the average.

The younger Comeback ewes have naturally not been so prolific, although it is pleasing to note that the six-tooth ewes, Flocks EA, IA, and GA have this season averaged over 105 per cent. There has been a distinct reduction in lambing percentages obtained from young Comeback ewes on the fertilised natural pasture, as the results from KI flock show an average of only 67 per cent. from all flocks, against 77, 83, and 85 per cent. from similar ewes on clover pasture.

It appears also that the ewes grazing on clover pasture fertilised with superphosphate and rock phosphate have been more prolific than those on similar pasture fertilised with lime or gypsum, and superphosphate; the results in table showing 85 per cent., 83 per cent., and 77 per cent. respectively for the three forms of fertilising for Comeback ewes, and 92 per cent., 90 per cent., and 86 per cent. when the half-bred ewes are considered as well.

For the first occasion this season a definite check was kept of the actual number of lambs born dead or alive in each flock, and this revealed that all the flocks on the clover pasture gave birth to approximately equal percentages, and varied only from 115 per cent. in Flock I to 119 per cent. in Flock E. The percentages of deaths between birth and marking were greater in some flocks than others. Consequently, for this season,

no variation in fertility of stock can be traced to the various manures, but the fertility has been definitely greater from sown pasture than natural pasture This fact is, no doubt, due to the better development of ewes obtained on the sown pasture.

The next table, No. 12A, shows the average weights of Comeback lambs at weaning time from each flock, and each age and grade of ewe.

TABLE 12A.—*Weights of Comeback Lambs at Weaning*, 1930-34.

Flocks of Ewes.	Weights of Lambs in Pounds.					Average.	
	18/1/30.	8/1/31.	5/1/32.	17/1/33.	4/1/34.		
E—Aged ewes	61·2	54·4	50·8	66·1	49·2	56·3	
E—Ewes born, 1929	—	—	61·9	65·5	49·8	59·1	
E—Ewes born, 1930	—	—	—	64·7	46·9	55·8	53·5
E—Ewes born, 1931	—	—	—	—	45·6	45·6	
I—Aged ewes	64·7	51·7	52·0	68·8	50·2	57·5	
I—Ewes born, 1929	—	—	67 0	67 2	46 0	60·1	
I—Ewes born, 1930	—	—	—	67·8	45·8	56·8	52·0
I—Ewes born, 1931	—	—	—	—	39·0	39·0	
G—Aged ewes	74·1	57·2	52 3	68 6	57·7	62·0	
G—Ewes born, 1929	—	—	64·1	56·2	48·2	56·2	
G—Ewes born, 1930	—	—	—	62·5	67·0	64·8	58·3
G—Ewes born, 1931	—	—	—	—	53·8	53·8	
KI—Ewes born, 1929	—	—	57·3	54·9	47·5	53·2	
KI—Ewes born, 1930	—	—	—	48·7	—	48·7	49·5
KI—Ewes born, 1931	—	—	—	—	46·6	46·6	
Average	66·7	54·4	57·9	62·8	49·5	54·4	

This table shows that there has been considerable variation in weights of lambs from season to season, the 1929 and 1932 drops weighing over 60lbs. each, whereas this season's were only 49.5lbs. This is possibly due to the variation in quality of feed, the heavy November rains this season tended to wash valuable food ingredients from the matured plants. Also the percentage of clover in the pastures was light, and this would appear to be a governing factor. The pastures of the plots fertilised with rock phosphate contained a higher proportion of clover than the other plots, and it is perhaps significant that the lambs reared on the former were considerably heavier at weaning time, namely, 56lbs. on average, as against 48lbs. and 45lbs. on the other series of plots. More annual grasses with their objectionable seeds and less clover amongst the dry feed had a decided detrimental effect on the lamb development.

DEVELOPMENT OF COMEBACK EWES ON SUBTERRANEARN CLOVER AND WIMMERA RYE GRASS PASTURE.

The Comeback ewes in the above flocks have been grazed on their respective plots from birth, excepting for a few weeks at weaning and mating times, when they were pastured on similar type of pasture.

It is significant that in each season there has been a marked difference in the rate of development. Each flock has increased in weight during the growing period of pastures, and decreased during the dry or autumn period.

On the sown pasture every season, with all ages of ewes, the development has been greater, and has been maintained by the ewes throughout their life.

The 1929 ewes have in their four seasons on the sown pasture averaged 113lbs. live weight, and on the natural pasture 94lbs., a maintained increase of 19lbs. (20 per cent.) in live weight in favour of the sown pasture.

The 1930 ewes have in their three seasons on the sown pasture averaged 109lbs., and on the natural pasture 93lbs., an increase of 16lbs. (17 per cent.)

The 1931 ewes have in two seasons on the sown pasture averaged 98lbs., and on the natural pasture 82lbs., also an increase of 16lbs. (19 per cent.).

Similarly the 1932 ewes for their initial season as hoggets have averaged 83lbs. on sown pasture, and 73lbs. on natural pasture, an increase of 10lbs. (14 per cent.).

TABLE 13.—*Wool Production of Comeback Ewes Bred on Sown Pasture and Bred on Natural Pasture.*

	Wool per Sheep. 1930.	1931.	1932.	1933.	Average per Annum.
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
1929 Ewes—					
GA 13	9 1	10 7	9 11	8 5	9 6
IA 17	8 7 } 8 10	9 9 } 9 14	9 9 } 9 11	8 11 } 8 9	9 1 } 9 3
EA 19	8 6	9 11	9 14	8 11	9 2
KIA 12	6 5	8 12	9 6	7 13	8 1
1930 Ewes—					
GB 11	—	9 12	10 7	8 14	9 11
IB 13	—	9 1 } 9 3	10 2 } 10 1	8 15 } 8 14	9 6 } 9 6
EB 15	—	8 11	9 10	8 12	9 0
KIB 4	—	6 9	8 10	7 0	7 6
1931 Ewes—					
GC 11	—	—	8 5	8 5	8 5
IC 13	—	—	7 3 } 8 0	8 0 } 8 6	7 9 } 8 3
EC 15	—	—	8 7	8 13	8 10
KIC 8	—	—	8 7	8 3	8 5
1932 Ewes—					
GD 7	—	—	—	8 11	8 11
ID 9	—	—	—	8 4 } 8 10	8 4 } 8 10
ED 9	—	—	—	8 14	8 14
KID 8	—	—	—	8 8	8 8

	2-tooths. 4 years Average.	4-tooths. 3 years Average.	6-tooths. 2 years Average.	8-tooths. 1 year.
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
Flock G	8 15	9 12	9 4	8 5
" I	8 4 } 8 9	9 4 } 9 7	9 4 } 9 4	8 11 } 8 9
" E	8 9	9 6	9 5	8 11
" KI	7 7	8 8	8 3	7 13
Increase sown over natural pasture	1 2 (15%)	0 15 (11%)	1 1 (13%)	0 12 (9%)

Table 13 shows the average wool production per sheep each season for the life of the sheep grazing on the variously fertilised Subterranean clover and Wimmera Rye grass plots (Flocks G, I, E) compared with Flock KI that has been bred on top dressed natural pasture. The wool production in the majority of flocks was a little below the average during 1933, and it is noticeable that those on top dressed natural pasture have averaged better during the past two seasons than in 1930 and 1931. However, for the four seasons the ewes on clover pasture have averaged 9lbs. wool per head per year, whilst those on natural pasture have averaged 7lbs 15ozs. per head, a difference of 13 per cent. in favour of sown pasture.

The lower section of the table gives the wool produced per year from the ewes at their respective ages. For four seasons two-tooth ewes on sown pasture have yielded 8lbs. 9ozs. each, 15 per cent. more than on top dressed natural pasture, which yielded 7lbs. 7ozs. per head. For

three seasons four-tooth ewes have yielded 9lbs. 7ozs. each on sown pasture, 11 per cent. more than on natural pasture with 8lbs. 8ozs. per head. For two seasons six-tooth ewes have yielded 9lbs. 4ozs. each on sown pasture, 13 per cent. better than 8lbs. 3ozs. yielded on natural pasture; whilst for one season eight-tooth ewes have produced 8lbs. 9ozs. on clover and 7lbs. 13ozs. on natural pasture, 9.6 per cent. better.

It is therefore quite apparent that sown pasture of Subterranean clover and Wimmera Rye grass definitely increases the wool production per head over well fertilised natural pasture.

There is, however, not much difference in production shown from the various types of fertilisers used on the sown pasture. Those ewes grazing on the pasture fertilised with rock phosphate have yielded 9lbs. 3ozs. wool each per annum, those on pasture fertilised with superphosphate have yielded 8lbs. 15ozs., whilst those on that fertilised with lime or gypsum and superphosphate have yielded 8lbs. 13ozs.—a difference of only 6ozs. per head between the highest and lowest averages.

HEALTH OF SHEEP.

With reference to the health of sheep in these flocks, the following table shows the deaths and percentages that have occurred during the four seasons under review.

TABLE 14.—*Deaths of Comeback Ewes*, 1930-33.

Flock.	1930.	1931.	1932.	1933.	Average.
Sown pasture—					
GA—15 ewes	1 (6 67%)	1 (8%)	1 (5 56%)	0 (0%)	5·06%
GB—11 Ewes	—	1	1	0	
GC—11	—	—	0	0	
GD—7 ewes	—	-	—	0	
IA—18 ewes	0 (0%)	2 (16 67%)	0 (2 33%)	0 (1·92%)	5·23%
IB—13 ewes	-	3	1	0	
IC—13 ewes	—	—	0	1	
ID—9 ewes	—	—	—	0	
EA—21 ewes	1 (4·76%)	0 (0%)	1 (2%)	0 (5·08%)	2·96%
EB—15 ewes	—	0	0	1	
EC—15 ewes	—	—	0	1	
ED—10 ewes	—	—	—	1	
Total G, I, E	2 (3·7%)	7 (7·78%)	4 (3·1%)	4 (2·61%)	4·30%
Total GA, IA, EA	2 (3·7%)	3 (5·88%)	2 (3·92%)	0 (0%)	3·38%
Total GB, IB, EB	—	4 (10·26%)	2 (5·13%)	1 (2·56%)	5·98%
Total GC, IC, EC	—	—	0 (0%)	2 (5·13%)	2·56%
Total GD, ID, ED	—	—	—	1 (3·85%)	3·85%
Natural pasture—					
KIA—12 ewes	0 (0%)	0 (0%)	1 (8·33%)	1 (9·09%)	4·35%
KIB—4 ewes	—	0	0	0	0%
KIC—8 ewes	—	—	0	0	0%
KID—8 ewes	—	—	—	0	0%
Total KI	0 (%)	0 (0%)	1 (4·17%)	1 (3·23%)	1·85%

It is noted that most deaths occurred during 1931 amongst the flocks grazing on sown pasture. The loss was 7.78 per cent. that season—more than double the loss of any other year—and these deaths were due almost entirely to entero-toxaemia, which affected the sheep during the late winter and early spring.

For the four seasons the average loss on the sown pasture has been 4.3 per cent. per year, and on the top dressed natural pasture 1.85 per cent., showing that where the system of rotational grazing has been observed

throughout the growing periods the losses have not been unduly high, but have been somewhat higher on sown pasture than natural pasture. This fact is verified by referring to an earlier portion of this report, in which it is shown that the losses amongst 87 ewes in Flocks A, B, C, and D on natural pasture has only been 0.92 per cent. per annum over a period of five seasons. The deaths on natural pasture have occurred more amongst six and eight tooth ewes, whereas the deaths on sown pasture have been greatest amongst two and four-tooth ewes. The losses on sown pasture have been slightly greater when the pasture has been fertilised with lime and superphosphate than when fertilised with rock phosphate, and somewhat less when fertilised with superphosphate only.

Amongst the ewes born in 1930 the losses have been 5.98 per cent., which is 2 per cent. greater than those occurring amongst ewes born any other season. After allowing for losses the following wool per acre per annum has been produced by the various aged ewes:—

During four seasons the 1929 ewes have yielded 32.8lbs. on sown pasture, and 23.4lbs. on natural pasture.

During three seasons the 1930 ewes have yielded 33.5lbs. on sown pasture, and 22.6lbs. on natural pasture.

During two seasons the 1931 ewes have yielded 31.3lbs. on sown pasture, and 25.9lbs. on natural pasture.

For one season the 1932 ewes have yielded 34.1lbs. on sown pasture, and 26.9lbs. on natural pasture.

These results distinctly show an increased production of 34 per cent. in wool per acre due to the cultivated pasture.

SOWN WINTER GRASSES.

Four seasons' results are now available of the grazing of five-acre plots comparing *Phalaris tuberosa* with Wimmera and Perennial Rye grasses. The ryes were established with 8lbs. seed per acre, and the *Phalaris tuberosa* with 2lbs.; each plot has received 1cwt. 45 per cent. superphosphate per acre annually, and they are all growing in conjunction with Subterranean clover, and were established on virgin non-top-dressed land.

Table 15 shows the grazing yields of these plots:—

Sown Grasses and Subterranean Clover, 1930-34.

Season.	Grazing in Sheep per Acre.		
	Wimmera Rye and Subt. Clover.	Perennial Rye and Subt. Clover.	*Phalaris tuberosa* and Subt. Clover.
1930-31	2·47	2·05	1·64
1931-32	1·70	1·48	3·52
1932-33	2·41	2·50	3·82
1933-34	3·70	3·62	3·52
Mean	2·57	2·41	3·12

These results show that for the four seasons *Phalaris tuberosa* and Subterranean clover has carried 3.12 sheep per acre—a half sheep per acre more than the Wimmera Rye and Subterranean clover—although for the immediate past season the Wimmera Rye produced slightly more feed than the *Phalaris tuberosa*.

The Perennial Rye plot was established with ordinary commercial seed, and has practically died out; the high grazing result for 1933 was due to the heavy growth of annuals on the plot which have superseded the Perennial Rye grass. Further plots of *Phalaris tuberosa* and Wimmera Rye grass will be established in 1934, and a definite comparison between the two species made under rotational grazing.

HAWKES BAY PERENNIAL RYE GRASS.

Hawkes Bay Certified Rye grass has been sown in three two-acre fields, No. 9D was sown in 1931, and Nos. 9C and 9B in 1932, the former with Alsike clover, and the latter two with Subterranean clover. Some *Phalaris tuberosa* was included with the 1932 seedings, but this made very little headway against the early vigorous growth of rye plants. Consequently the bulk of the grass growth produced has been rye grass, and it has proved definitely inadvisable to sow *Phalaris tuberosa* in conjunction with rye grass.

The grazings received from the three fields since seeding to pasture have been as follows:—

TABLE 16.—*Hawkes Bay Rye Grass Grazing Results*, 1931-33.

Field.	Season.	Grazing in Sheep per Acre.
No. 9D	1931-32	1·43
"	1932-33	3·57
"	1933-34	2·21
No. 9C	1932-33	2·12
"	1933-34	2·36
No. 9B	1932-33	3·00
"	1933-34	2·39
Mean		2·44

The grass seeds were sown on stubbles in Fields Nos. 9D and 9C, but in 9B the seeds were sown on well-prepared fallow. Consequently the first season's result from the latter was much greater than from the former field. The average of 2.44 sheep per acre per annum is a good comparative return from the grass, which gives a very useful bite of green following summer and autumn rains, but does not provide as good winter growths as the annual grasses. It is noticeable that the plants appear to be persisting better than those in previous trials of ordinary commercial Perennial Rye grass strains, but nevertheless the percentage of rye grass in these pastures has been about 15 per cent. less this season than the previous, and the amount of annuals has increased. Careful readings of counts and estimations of plant species are being recorded, and at the conclusion of several more seasons' work definite results on the life of Perennial Rye plants will be available.

SUBTERRANEAN CLOVER.

The grazing results of general fields of the Farm, that is, those outside the purely experimental pasture areas, have been recorded. Those established with Subterranean clover have been grouped together, and the following table shows the results for the past 10 seasons.

TABLE 17.—*Subterranean Clover Grazing, Kybybolite,* 1924-34.

Season.	No. of Fields.	Area.	Total Feed Days.	Sheep per Acre.
		Acres.		
1924-25	1	29·50	29,469	2·74
1925-26	3	109·00	100,794	2·53
1926-27	5	181·50	141,041	2·13
1927-28	6	231·80	208,635	2·47
1928-29	7	267·66	234,378	2·40
1929-30	7	263·71	220,071	2·29
1930-31	5	155·70	138,417	2·44
1931-32	7	237·40	238,234	2·74
1932-33	6	181·26	181,900	2·75
1933-34	8	205·62	210,492	2·80
Mean		1,863·15	1,703,431	2·50

The above table represents the grazing taken from all general clover fields that have not been cut for meadow ensilage or hay, but does not represent their full grazing capacity, as it has not been practical to completely graze all fields every season. It is necessary to hold back fields to provide reserve of feed during April and May, causing a consequent loss of feed which varies with the seasons. The result from these pastures for the immediate season of 2.80 sheep per acre is the best so far recorded —a slight increase on the previous two. The average of 2.50 sheep for the past 10 seasons shows a useful and marked consistency.

Of individual fields under clover this season several yielded over four sheep per acre—No. 6E (9.14 acres) carried 4.45, No. 12 (27 acres) carried 4.15, and No. 6F (11.06 acres) carried 4.02 sheep. Some of the older established fields have not been top dressed regularly of recent years, and their yields have been below average.

TOP DRESSING OLD CULTIVATED LAND.

For the past nine years some areas that have been cultivated for a period of from 15 to 20 years have been left out of the cropping area, and to enhance their grazing they have been top dressed with superphosphate, but no grasses or clovers have been sown. This has had the effect of greatly increasing the growth of naturalised grasses and clovers. The following table summarises the grazing received from this class of pasture each season:—

TABLE 18.—*Grazing of Top Dressed Old Cultivated Land, Kybybolite,* 1925-34.

Season.	No. of Fields.	Area.	Total Feed Days.	Sheep per Acre.
		Acres.		
1925-26	1	50·00	30,097	1·65
1926-27	4	140·47	68,764	1·34
1927-28	3	102·47	76,196	2·04
1928-29	3	121·07	102,089	2·31
1929-30	4	151·83	144,242	2·60
1930-31	4	151·83	134,629	2·43
1931-32	4	151·83	123,491	2·22
1932-33	3	93·38	83,588	2·45
1933-34	2	76·31	93,827	3·37
Total		1,039·19	856,923	2·26

Similar land left out of cultivation but not top dressed has, during the past six seasons, carried 1.41 sheep per acre.

As a comparison to the above the following two tables are included to show the grazing received from similar land that has never been cultivated.

Table 19 shows the combined results of all such land that has been top dressed, whilst Table 20 shows the results from a fair area of unimproved natural land, that is, land that has neither been cultivated nor top dressed:—

TABLE 19.—*Grazing of Improved Natural Land by Top Dressing Only, Kybybolite,* 1921-34.

Season.	No. of Plots.	Area.	Total Feed Days.	Sheep per Acre.
		Acres.		
1921-22	5	17·5	9,971	1·56
1922-23	5	17·5	9,458	1·48
1923-24	5	17·5	10,949	1·71
1924-25	6	21·0	21,859	2 85
1925-26	8	31·0	18,874	1·67
1926-27	11	43·0	28,948	1·84
1927-28	11	43 0	29,765	1·90
1928-29	11	43·0	38,880	2·48
1929-30	12	46·5	35,261	2·08
1930-31	12	46·5	47,900	2·82
1931-32	12	46·5	49,791	2 93
1932-33	12	46·5	52,721	3 11
1933-34	11	43 0	49,235	3·14
Total		462·5	403,612	2·39

TABLE 20.—*Grazing of Unimproved Natural Land, Kybybolite,* 1921-34.

Season.	No. of Plots.	Area.	Total Feed Days.	Sheep per Acre.
		Acres.		
1921-22	2	116·5	33,324	0·78
1922-23	2	116·5	28,180	0·66
1923-24	2	116·5	17,343	0·41
1924-25	2	116·5	28,431	0·67
1925-26	3	88·5	23,711	0·73
1926-27	3	61·5	15,725	0·70
1927-28	3	44·5	16,887	1·04
1928-29	2	8·5	1,912	0·62
1929-30	5	19 0	5,407	0·78
1930-31	5	19·18	6,291	0·90
1931-32	4	15·68	5,392	0·94
1932-33	4	15 68	5,000	0·87
1933-34	2	8·5	2,687	0·87
Total		747·04	190,290	0·70

In summarising the grazing results of the Farm the areas that have been subjected to the different treatments for a number of years are collected and averaged over the various periods in the following table.

TABLE 21.—*Summary of Grazing Results at Kybybolite.*

Type of Grazing.	No. of Years Tested.	Area Acres.	Sheep per Acre per Annum.	Increase over no Manure. Sheep.	Increase over no Manure. Per Cent.
Subt. Clover and Wimmera Rye Grass (Expl.)	9	70·5	3·38	2·68	383
Subt. Clover and *Phalaris tuberosa*	4	5·0	3·12	2·42	346
Subt. Clover (large fields)	10	186·32	2·50	1·80	257
Hawkes Bay Rye Grass and Clover	3	6·0	2·44	1·74	249
Improved Natural Land (Topdressing only) .	13	35·58	2·39	1·69	241
Topdressed old cultivated land	9	115·47	2·26	1·56	223
Non-topdressed old cultivated land	6	32·08	1·41	0·71	101
Natural land (unimproved)	13	57·46	0·70	—	—

The results in Table 21 can be looked upon as a fair comparison, although it must be remembered that all large fields have not been fully grazed amongst items 3, 6, and 7. However, as they are averaged over a number of years, the table is useful and interesting, and continues to show the advantages to be gained from Subterranean clover, Wimmera Rye grass, and top dressing with phosphates.

NITROGEN FERTILISER TEST.

During the past two seasons work carried out in conjunction with the Nitrogen Fertilisers Proprietary Limited has been confined to two four-acre plots. These were ploughed in February, 1932, worked well, and sown to the following pasture mixture per acre at the end of April in that season:—

10lbs. Certified Perennial Hawkes Bay Rye grass.
4lbs. *Phalaris tuberosa.*
2lbs. White Dutch clover.
1lb. Subterranean clover.

Both plots were given a dressing of ½ ton lime and 1cwt. 45 per cent. superphosphate per acre, the dressings of lime and superphosphate being applied one month apart. During August, 1932, 1cwt. 20 per cent. sulphate of ammonia was broadcasted per acre on Plot No. 1. Superphosphate at the rate of 1cwt. per acre was again applied to both plots during April, 1933, and sulphate of ammonia (1cwt. per acre) was also applied to Plot No. 1 in late July, 1933. Both plots were harrowed in June, 1933.

The following table shows the grazing results from the plots for the two seasons:—

TABLE 22.—*Nitrogen Fertiliser Test, Kybybolite,* 1932-34.

Plot.	Grazing in Sheep per Acre. 1932-3.	1933-4.	Mean 1932-4.
N1. Lime, super, and nitrogen ..	4.26	3.76	4.01
N2. Lime and super	3.26	3.24	3.25

These plots produced a very nice stand of pasture, which consisted principally of Perennial Rye grass, which thrived well the first season, 1932. During the winter of 1933 the rye grass, however, made only poor

growth, and was in marked contrast to annual grasses and clovers growing on adjacent plots. The rye grass recovered well in the spring, and finally produced quite a good average throughout the season. As the table shows, the nitrogen fertiliser caused an increase of approximately $\frac{3}{4}$ sheep per acre per annum, but the difference in the second season was only half of that secured during the first season.

Counts of plants revealed that there was a greater death of rye grass plants during the second season on the nitrogen dressed plot than on the No. 2 plot, which received no artificial nitrogen fertiliser. There was, however, 40 per cent. more plants of rye established on the former plot at the close of the first season, and consequently a greater death on the thicker stand was not unexpected. Also the *Phalaris tuberosa* grass was able to establish a little better amongst the thinner stand of rye of No. 2 plot.

The experiment once again demonstrates the necessity of maintaining good healthy clover growths amongst the perennial grasses to enable the latter to secure sufficient fertility.

TRIALS OF GRASS AND HERBAGE STRAINS.

By the aid of grant made to us by the Australian Dairy Council, work was commenced in 1932 to test various strains of grasses and clovers with the view of selecting the more persistent and productive strains for ultimate seed production.

A collection of perennial rye grass strains were secured from New Zealand, Victoria, and South Australia from various sources, as well as available strains of *Phalaris tuberosa.* These were sown under field conditions in 1932, and have since been maintained under good grazing conditions. Periodically notes have been taken on the growth and health of plants in the strains, and prominent individual plants have been pegged and noted both as prolific winter growers and also those that have shown to advantage in the summer months. Particular attention has been given to the health of Perennial rye grass plants during the mid-winter months

Sufficient result has been obtained at present to show that there is a marked variation between strains, and also that many types of plants exist amongst the individual strains themselves.

Similarly some strains of *Phalaris tuberosa* have shown marked superiority to others, and in one or two cases the advantage has been sufficient and the type sufficiently definite to warrant transplanting to isolated positions with a view of seed collection.

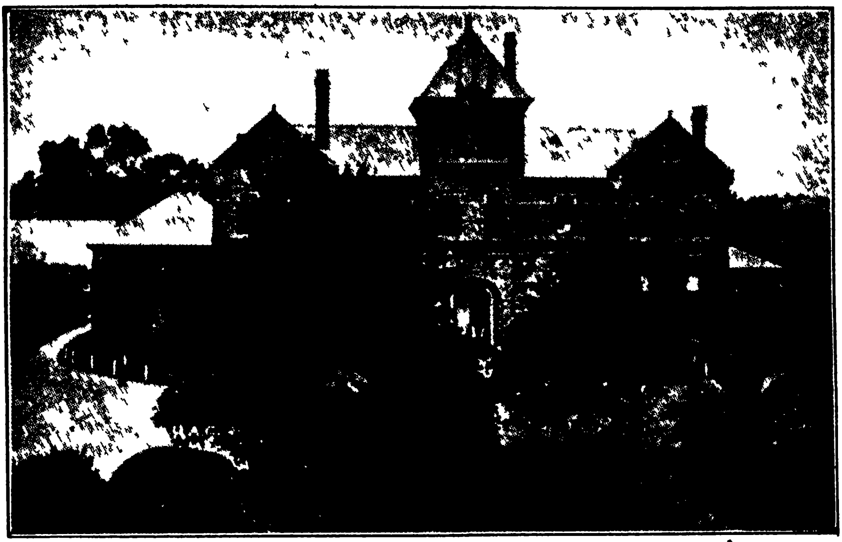
Some progress has been made with the selection of types of Annual Rye grasses, and isolated plots of these selected strains are being grown this season. The accompanying photos. show quite a 100 per cent. increase in early leaf and stem growth secured from selected strains above that of the parent plants.

Very little success has as yet been obtained with strains of other species of grasses, although several are under close observation.

Also, so far, little success has been secured from the latest strains of white and red clovers under our conditions.

Quite distinctive results have been recorded from various strains of Subterannean clover under trial, and the behaviour of these during future seasons will be carefully recorded.

Finally I wish to record valuable assistance and diligence to duties given by the staff of the farm throughout the season.



INVESTIGATION DESIGNED TO IMPROVE CULTURAL PRACTICES IN CURRANT VINEYARDS LOCATED IN NON-IRRIGATED COASTAL DISTRICTS IN SOUTH AUSTRALIA BEGUN JULY, 1932.

[In our March, 1934, issue Mr. Geo. Quinn (Chief Horticultural Instructor) presented the First Progress Report of the above Investigation and the Second Report is appended below. The work undertaken consists, briefly, as follows:—

(1) *Methods of re-organising old debilitated vines in low yielding and unprofitable currant vineyards.*

(2) *Testing the comparative values of various systems of pruning in relation to the productivity of normal vines and of the quality of the fruit borne by them.*

(3) *Gauging the crop yielding capacities of groups of normal currant vines in selected vineyards with a view to initiating manurial trials.]*

In addition, certain growth and fruit cropping studies were conducted in minute detail during the growing season of 1932-33 on vines selected at random in the plots devoted to the above. The data accumulated from these studies were passed over to officers of the Council for Scientific and Industrial Research for statistical analysis and comparison with data similarly obtained in the Currant vineyards grown under irrigation in the Murray Valley. With the exception of certain measurements taken of the development of the Currant berries at intervals from setting until harvest time, the work during the period under review, viz., 1933-34, has been confined to the continuation of the three above-mentioned field operations.

A local committee of Currant growers has been formed in each district (Clare, Barossa, and McLaren Flat) to watch the progress of the investigational work, and considerable interest in the work has been displayed.

That portion of the work designed to re-organise old non-profitable vines has made considerable and substantial progress, thanks largely to the prompt assistance rendered by the owners of the respective plots in removing the old dilapidated trellises and replacing them with newer and more up-to-date types, and attending to other cultural and drying operations. The owners of these vineyards have entered into the renovating procedure with enthusiasm, and it is hoped that from the figures kept of the work and the crops harvested the officials of the investigation may soon be in a position not only to demonstrate the practicability of re-organising these old plantations, but to show what the exact cost may be to the owner of inaugurating the change and bringing the vineyard back to a highly productive condition. The method adopted in the first instance, when the old vines were cut off at ground level and new shoots arising therefrom led up to the trellis, is being supplemented by several methods of layering these growths in the establishment of the new vines. The writer's experience leads him to the opinion that this will prove the most satisfactory procedure for securing permanently healthy vines, as it will ultimately eliminate the old stumps, into which the entrance of decay cannot be wholly prevented.

Although it is premature to arrive at definite conclusions at this stage of the investigation, there is at present some indication that certain methods of pruning have a direct influence on various phases of fruit production in the Zante

Currant. Observations of the growth reactions displayed by the vines, which are spur pruned in winter and disbudded of all surplus sprouts, other than from the spurs, in the spring, indicate during the two seasons that the work has been in progress a great improvement in the size and texture of the canes arising from such spurs. Studies made elsewhere have shown a direct correlation—within certain limits—between the strength of the cane and the weight and quality of the fruit borne thereon.

In this respect the figures given in this and the previous report show that whilst the gross weight of fruit borne by the disbudded spur pruned vines has not yet in all cases equalled that on the spur pruned plants which have not been disbudded, the quality of the dried Currants has excelled it to an appreciable degree. Owing to this increased strength of the individual canes produced by them, an additional number of spurs has been retained on the spur pruned disbudded vines for the coming season. This procedure has partially been instigated by the greater loss of sprouts from these vines by wind breakages during the earlier and more brittle stages of their development.

Another feature which has been emphasised from data obtained by harvesting and drying the fruit borne by shoots arising from the various parts of the vines pruned by these three methods is that spur pruned Currant vines, when grown in the richer soils and cooler conditions of these non-irrigated areas, produce, in comparison with those which are rod and spur pruned, a greater number of seed bearing berries known as "bucks." On the other hand, the rod and spur pruned Currant vines, whilst thus far producing a greater weight of fruit, have, at the same time, given definite evidence that it is done to the detriment of the quality of the dried product. As this investigation has been designed for the purpose of improving the quality of the Currants grown in the coastal areas, the results thus far obtained may be claimed to be distinctly encouraging to the prosecution of further efforts in that direction.

It may be recorded here that the weather conditions, which have such an important bearing on each season's results in investigational work such as this, and particularly in non-irrigated areas, have been very diverse during the two years it has been in progress. The winter of 1932 was an extremely wet season, followed by an unusually cool summer. The foliage on the Currant vines, even into the harvesting period, showed no lack of moisture in the soil, and the fruit, in consequence, displayed a tendency to lag in sugar formation. The winter of 1933, though not lacking in rainfall, turned suddenly dry in September, and the Adelaide Weather Bureau records show that from the end of that month until 26th March, 1934, only 206 points of rain fell. These were spread over 23 readings, showing how superficial the individual falls were. The average annual rainfall in Adelaide over the same period for the past 95 years was 458 points. In addition to this lack of moisture, two heat waves were experienced. One in January lasted 11 days, on nine of which the temperature ranged from 100° to 110° Fahr. in the shade. This did not appear to affect the vineyards, but the second was an unprecedently late burst of heat, beginning on 4th March and lasting 12 days, during which seven consecutive days ranged between 102.2° to 110.5° Fahr. in the shade. This great heat, coming when the land was at its driest stage, burned the foliage and shrivelled and semi-dried the already fully ripened Currant berries. Hence the very high Baumé readings and drying ratio to be seen in the data given herein.

The following tables of figures set out the position in respect to the results of the work done during the season ending with the Currant harvest of 1934.

THE RE-ORGANISATION OF OLD CURRANT VINES.

Clare District—Stanley Flat (Mrs. A. Dolan), Season 1934.

As described in the first progress report (see *Journal of Agriculture*, March, 1934, page 965), in this vineyard two rows consisting of 121 vines were cut off in 1932 season and reconstructed on lines described therein.

In the season under review, these young vines bore their first crop of fruit, viz., 1,307lbs. fresh Currants. The owner also harvested the crop from a corresponding number of old vines in the rows immediately north of those reconstituted. The results of the cropping of the reconstructed vines and the old control vines during the 1934 harvest are as under:—

Reconstructed Vines.

No. of Vines Recorded.	Total Yield Fresh	Average Yield Fresh per Vine	Total Yield Dried	Drying Ratio.	Average of Four Baume Readings	Rate per Acre. Fresh.	Rate per Acre. Dried
	Lbs	Lbs	Lbs.			Lbs.	Lbs.
112 planted 10 x 11 896 p.a.	1,307	11 67	413	3 16	14 87	4,021 = 2T 1C 1Q 1L	1,460 = 13C 4L

Old Check Vines.

121 planted 10 x 11	2,495	20 62	880	2 83	14 37	8,165 = 3T 12C. 3Q. 17L.	2,888 1T. 5C. 3Q. 4L.

Barossa District—Angaston (Mr. G. L. Wishart), Season 1934.

In this 60-year old vineyard three rows, consisting of 124 vines, were also cut off in 1932 and 116 responded, and are undergoing reconstruction. These young vines bore a small crop for the first time, viz., 848lbs. of fresh Currants. A crop yield record is being taken from the next adjoining three rows for purposes of comparison. The harvest of 1934 yielded the following results:—

Reconstructed Vines.

No. of Vines Recorded	Total Yield Fresh.	Average Yield Fresh per Vine	Total Yield Dried.	Drying Ratio	Average of Four Baume Readings	Rate per Acre Fresh.	Rate per Acre Dried
	Lbs.	Lbs.	Lbs.			Lbs.	Lbs
116 planted 8' 6" x 16' 136 p.a.	848	7 31	316	2 68	13 5	994 8C 3Q 14L	368 3C. 1Q 4L

Old Check Vines.

124	1,380	11·1	412	3 35	14 5	1,513 13C. 2Q. 1L.	452 = 4C. 4L.

When graded into commercial grades, the following results were obtained by the Angaston Fruitgrowers' Co-operative Packing Shed:—

Reconstructed Vines—

64lbs. 3 Cr. large.
242lbs. 3 Cr.
10lbs. Mfs.

Old Check Vines—

132lbs. 3 Cr. large.
274lbs. 3 Cr.
6½lbs. Mfs.

McLaren Flat (Mr. R. G. Bell), Season 1934.

In this 30-year old vineyard two rows, equalling 76 vines which had been cut off during winter of 1932 and reconstructed on a new trellis, cropped for the first time. These vines were not cinctured and the berries were uniformly small,

but quite good. By request, Mr. Bell also harvested and recorded the crop from the next adjacent two rows of old vines. The following are the results of the croppings:—

Reconstructed Vines.

No. of Vines Recorded.	Total Yield Fresh.	Average Yield Fresh per Vine.	Total Yield Dried.	Drying Ratio.	Average of Four Baume Readings.	Rate per Acre. Fresh.	Rate per Acre. Dried.
	Lbs.	Lbs.	Lbs.			Lbs.	Lbs.
76	639	8·40	226	2·82	—	—	—
Old Check Vines.							
78	1,425	18·27	469	3 03	—		

These dried fruits were graded by Mr. Bell, with the following results:—

Reconstructed Vines—

194lbs. 3 Cr. small.
32lbs. 2 Cr. small.
— Bucks.
6½lbs. waste.

Old Check Vines—

440lbs. 3 Cr.
24lbs. 1 Cr.
5lbs. Bucks.
14½lbs. waste.

TESTING THE SYSTEMS USED IN PRUNING CURRANT VINES.

Clare District—Sevenhills (Mr. W. H. Penna), Season 1934.

This test, which embodies 33 groups, each containing three Currant vines, and in each of which groups three different pruning treatments are repeated, was continued. The results of the 1934 harvest are given below:—

Method of Pruning.	No. of Vines.	Total Yield Fresh	Average Per Vine	Total Dried.	Baume Reading.	Drying Ratio.	Total Yield Per Acre Rate. Fresh.	Total Yield Per Acre Rate. Dry.
		Lbs.	Lbs.	Lbs.		Lbs.	Lbs	Lbs.
S. (Spur Pruned)	33 (Planted 10 x 11 396 p a.)	1,118	33 87	295	13°	3·79	13,416 5T. 19C. 3Q. 4L	3,540 – 1T. 11C. 2Q. 12L.
S.D. (Spur pruned and disbudded)	33	866	26 24	242	15·5°	3 57	10,392 = 4T. 12C. 3Q 4L	2,904 = 1T. 5C. 3Q. 20L.
R.S. (Rod and Spur pruned)	33	579	17 54	139	11·5°	4·16	6,948 = 3T. 2C. 4L.	1,668 = 14C. 3Q. 16L.
Spurs	—	651	19 72	162	12·5°	4 01	7,812 3T. 9C. 3Q.	1,944 = 17C. 1Q. 12L.

RESULTS OF PROCESSING AND GRADING THE DRIED CURRANTS—SEASON 1934.

Method of Pruning.	No. of Vines Recorded.	3 Cr. L.	3 Cr.	2 Cr.	M.F.	Bucks.	Total Dried Fruit.	Waste.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
S. (Spur pruned) ..	33 19·03%	58 68·90%	210 ·90%	9¼ 3·03%	1¾ ·57%	16 5·25%	295	9¾ 3·19%
S.D. (Spur pruned and disbudded)	33	52¼ 20·83%	169¼ 67·49%	6¼ 2·59%	1 0 39%	13 5·18%	242	8¼ 3·48%
R.S. (Rod and Spur pruned) Rods	33	9¼ 6·20%	116 77·85%	7½ 5·03%	4 2·68%	2¼ 1·51%	139	10 6·71%
Spurs	—	24 13·95%	115¼ 67·00%	8¼ 4 79%	1½ 0·87%	13 7·55%	162	10 5·81%

Barossa District—Light's Pass (Mr. P. B. Boehm), Season 1934.

This test plot also contains 99 vines, divided into 33 groups of three vines each, thus presenting 33 replications of each method of pruning under comparative test. The results given below have no doubt been much reduced owing to a spring frost occurring in this vineyard shortly after bud burst. In the spring of 1932 a similar frost was experienced, but its ill-effects were not so severe as from that of 1933. The following is a summary of the results obtained from the 1934 Currant harvest.

Method of Pruning.	No. of Vines.	Total Yield Fresh.	Average Per Vine.	Total Dried.	Baume Reading.	Drying Ratio.	Total Yield Per Acre Rate.	
							Fresh.	Dry.
		Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.
S. (Spur pruned)	33 (Planted 10 x 12 = 363 p.a.)	426	12 9	148½	16°	2 86	4,686 = 2T. 1C. 3Q. 10L.	1,633½ = 14C. 2Q. 9½L.
S.D. (Spur pruned and disbudded)	33	473	14 33	167½	16°	2·82	5,203 = 2T. 6C. 1Q. 23L.	1,842½ = 16C. 1Q. 22L.
R.S. (Rod and Spur pruned) Rods	33	193	5·84	63¾	15·75°	3 02	2,123 = 18C. 3Q. 23L.	701¼ = 6C. 1Q. 1¼L.
Spurs	—	265	8 03	82	15°	3·23	2,915 = 1T. 6C. 3L.	902 = 8C. 6L.

RESULTS OF PROCESSING AND GRADING THE DRIED CURRANTS—SEASON 1934.

Method of Pruning.	No. of Vines Recorded.	3 Cr. L.	3 Cr.	2 Cr.	M.F.	Bucks.	Total Dried Fruit.	Waste.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
S. (Spur pruned) ...	33	91½ 57·18%	42½ 26·56%	—	½ 0·31%	14 8·75%	148½	11½ 7·18%
S.D. (Spur pruned and disbudded)	33	97 57·73%	58½ 34·82%	—	1 0 59%	11 6 54 %	167½	½ 0·29%
R.S. (Rod and Spur pruned) Rods	33	36 52·17%	26 37·68%	–	¼ 0·36%	1½ 2·17%	63¾	5¼ 7·60%
Spurs	—	51 57·95%	28 31·81%	—	½ 0·56%	2½ 2 84%	82	6 6·81%

McLaren Flat (Mr. R. G. Bell), Season 1934.

This plot contains 126 vines, divided into 42 groups of three vines each, thus affording 42 replications of each of the three methods of pruning under test. The following are the results of the Currant harvest of 1934:—

Method of Pruning.	No. of Vines.	Total Yield Fresh.	Average Per Vine.	Total Dried.	Baume Reading.	Drying Ratio.	Total Yield Per Acre Rate.	
							Fresh.	Dry.
		Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.
S. (Spur pruned)	42 (Planted 10 x 10 = 435 p.a.)	568½	13·54	283	19°	2·009	5,890 = 2T. 12C. 2Q. 10L.	2,931 = 1T. 6C. 19L.
S.D. (Spur pruned and disbudded)	42	413½	9·85	221	20·5°	1·87	4,285 = 1T. 18C. 1Q. 1L.	2,889 = 1T. 1Q. 21L.
R.S. (Rod and Spur pruned) Rods	42	786¾	18·73	257¾	15 5°	3·05	8,148 = 3T. 12C. 3Q.	2,664 = 1T. 3C. 3Q. 4L.
Spurs	—	316¼	7·53	101¾	16·25°	3·11	3,278 = 1T. 9C. 1Q. 2L.	1,051 = 9C. 1Q. 15L.

RESULTS OF PROCESSING AND GRADING THE DRIED CURRANTS—SEASON 1934.

Method of Pruning.	No. of Vines Recorded.	3 Cr. L.	3 Cr.	3 Cr.	1 Cr.	Bucks.	Total Dried Fruit.	Waste.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
S. (Spur pruned) ...	42	—	264B	—	11B	8	283	7
			91·03%	—	3·79%	2·75%	—	2·41%
S.D. (Spur pruned and disbudded)	42	—	204	8	—	9	221	8
			89·08%	3·49%	—	3·92%	—	3·49%
R.S. (Rod and Spur pruned) Rods	42	—	—	238½	18	¾	257¼	2¾
				91·73%	6·92%	0·28%	—	1·05%
Spurs	—	—	—	94½B	4½B	2½	101½	4¾
				88·94%	4·23%	2·35%	—	4·47%

CROP YIELD TEST—McLaren Flat (Mr. A. H. Fraser), Season 1934.

Group.	Vine Numbers.	Total Yield of Group.	Average per Vine.
		Lbs.	Lbs.
A	1 to 6	176½	29·41
B	7 to 12	90¼	15·04
C	13 to 18	126	21·00
D	19 to 24	218	36·33
E	25 to 30	192½	32·83
F	31 to 36	246¾	41·12
G	37 to 42	213¾	35·62
H	43 to 48	158¾	26·45
I	49 to 54	230	38·33
J	55 to 60	175	29·16
K	61 to 66	132¼	22·04
L	67 to 72	187½	31·25
M	73 to 78	81½	13·58
N	79 to 84	114¼	19·04
O	85 to 90	99½	16·58
P	91 to 96	132	22·00
Q	97 to 102	209	34·83
R	103 to 108	162¾	27·12
S	109 to 114	147¾	24·62
T	115 to 120	81¾	13·62
U	121 to 126	185¼	30·87
V	127 to 132	251½	41·91
W	133 to 138	147½	24·58
X	139 to 144	248	41·33

SUMMARY OF FRESH FRUIT YIELDS.

No. of Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine.	Average of Eight Baume Readings.	Total Yield at Acre Rate (Fresh).
	Lbs.	Lbs.	Lbs.		Lbs.
144 (planted 12′ x 12′ = 302 p.a.)	4,008	167	27·83	14·56°	8,406 = 3T. 15C. 0Q. 6L.

SUMMARY OF DRIED FRUIT WEIGHTS.

No. of Vines Recorded.	Total Yield.	Average Yield per Group.	Average per Vine (Dried).	Drying Ratio.	Rate per Acre Dried Fruit.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
144 (planted 12′ x 12′ = 302 p.a.)	1,263	52·62	8·77	3·17	2,649 = 1T. 3C. 2Q. 17L.

NOTE.—By mutual arrangement with Mr. Fraser, this work has been discontinued in this vineyard.

CROP YIELD TEST—Stanley Flat (Mr. C. Neate), Season 1934.

Group.	Vine Numbers.	Total Yield of Group.	Average per Vine.	
		Lbs.	Lbs.	
A	1 to 5	255½	51·10	Six muscat.
B	7 to 11	226	45·20	12 muscat.
C	13 to 15	112½	37·50	16 missing, 17, 18 muscats.
D	19 to 24	192½	32·08	
E	25 to 30	176½	29·41	
F	32 to 36	275½	55·10	31 missing.
G	37 to 42	176	29·33	
H	43 to 48	209	34·83	
I	49 to 54	212½	35·41	
J	55 to 60	251	50 20	57 missing.
K	62 to 66	195½	39·10	61 missing
L	67 to 72	162	27·00	
M	73 to 78	144	28·80	77 missing.
N	79 to 84	143	23·83	
O	85 to 90	177	29 50	
P	91 to 96	153½	25·58	
Q	97 to 102	187½	31·25	
R	103 to 108	219½	36 58	

SUMMARY OF FRESH FRUIT YIELDS.

No. of Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine.	Average of Eight Baume Readings.	Total Yield per Acre Rate (Fresh).
	Lbs.	Lbs.	Lbs.		Lbs.
99 (planted 10′ x 11′ = 396 p.a.)	3,469	192 72	35 04	13 75°	13,876 6T. 3C. 3Q. 16L.

SUMMARY OF DRIED FRUIT WEIGHTS.

No. of Vines Recorded.	Total Yield, Dried.	Average Yield per Group.	Average Yield per Vine.	Drying Ratio.	Rate per Acre (Dried).
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
99 (planted 10′ x 11′ = 396 p.a.)	1,434	79·66	14·48	2 41	5,736 = 2T. 11C. 0Q. 24L.

CROP YIELD TEST—Light's Pass (Mr. P. B. Boehm), Season 1934.

Group.	Vine Numbers.	Total Yield of Group.	Average per Vine.	
		Lbs.	Lbs.	
A	1 to 6	65	10·83	
B	7 to 12	58	9·66	
C	13 to 18	45½	7·58	
D	19 to 24	50¼	8·37	
E	25 to 30	81½	16·30	27 non-bearing young vine.
F	31 to 36	48	8·00	
G	37 to 42	35¾	5·95	
H	43 to 48	67	11·16	
I	49 to 54	114	19·00	
J	55 to 60	121	20·16	
K	61 to 66	23	7·66	64, 65, 66 mistaken for barrier row by pickers.
L	67 to 72	17	5·66	70, 71, 72 mistaken for barrier row by pickers.
M	73 to 78	52½	17·50	76, 77, 78 mistaken for barrier row by pickers.
N	79 to 84	44½	14·83	82, 83, 84 mistaken for barrier row by pickers.
O	85 to 90	46	15·33	88, 89, 90 mistaken for barrier row by pickers.
P	91 to 96	54½	9·83	
Q	97 to 102	76½	12·75	
R	103 to 108	80	13·33	
S	109 to 114	70	11·66	
T	115 to 120	116	19·33	
U	121 to 126	105½	17·58	
V	127 to 132	82½	13·75	
W	133 to 138	99	16·50	
X	139 to 144	94	15·66	
Y	145 to 150	100	16·66	

SUMMARY OF FRESH FRUIT YIELDS.

No. of Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine.	Average of Five Baume Readings.	Total Yield per Acre Rate (Fresh).
134 (planted 10′ x 12′ = 363 p.a.)	Lbs. 1,747	Lbs. 69·88	Lbs. 13·03	15·75°	Lbs. 4,732 = 2T. 2C. 1Q.

SUMMARY OF DRIED FRUIT WEIGHTS.

No. of Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine (Dried).	Drying Ratio.	Total Dried per Acre Rate (including Stems and blowouts).
134 (Planted 10′ x 12′)	Lbs. 605	Lbs. 24·2	Lbs. 4·51	Lbs. 2·88	Lbs. 1,639 = 14C. 2Q. 15L.

This dried fruit was graded into [illegible] 2 Cr.; [illegible] 2 Cr.; 6lbs. 31 Cr.; 47lbs. Bucks; 33½lbs. stems and blowouts.

NOTE.

From close observations made of the Currants at harvesting time from the pruning plots at Mr. W. H. Penna's vineyard at Sevenhills and from Mr. P. B. Boehm's vines at Light's Pass, Mr. Quinn formed the opinion that in processing and grading the dried samples the Angaston Co-operative Shed applied the grade designation of 3 Cr. L. to a different type of fruit from that selected at the Clare Co-operative Shed. The latter was a much larger and bolder Currant, and if graded on the Clare basis, most of the Light's Pass fruit would have been included in the 3 Cr. It should be more satisfactory for purposes of comparison if steps could be taken to secure greater uniformity in this matter in future lots.

SEED WHEAT FROM CROP COMPETITIONS.

In Wheat Competitions conducted in the undermentioned Districts the following Competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

CENTRAL—

A. H. Wolf, Rosedale—Pine Head.
L. W. George, Wasleys—Sword.
Matters and McCabe, Wasleys—Sword.
W. K. Oliver, Wasleys—Sword.
N. J. Griffiths, Salisbury—Bencubbin, Ghurka, Dundee.
Dawkins and Aunger, Gawler—Sword.
Kerr and Cliff, Waratah—Waratah.
W. F. Leak, Willaston—Pine Vale, Quality, Nabawa.

JERVOIS—

W. Jericho, Cleve—Waratah.
J. Brus and Sons, Mangalo—Sword.
L. H. and D. H. Hogg, Darke's Peak—Nabawa, Waratah, Sword.
M. H. Burton, Rudall—Waratah.
F. I. Kestel, Rudall—Bencubbin.
D. C. McCallum, Rudall—Waratah.

BUXTON—

H. Cant, Kimba—Sword.

SOUTHERN—

S. Wachtel, Palmer—Sword.
M. Wachtel, Palmer—Nabawa.
L. H. Wachtel, Palmer—Nabawa.
J. O. Bottroff, Palmer—Sword, Nabawa.
G. W. Faehrmann, Palmer—Nabawa.
H. B. Scheer, Mannum—Sword.
C. A. Whittlesea, Langhorne's Creek—Late Gluyas.
J. Rzeszskowski and Mattner Bros., Finniss—Sword.
Rankine Bros., Strathalbyn—Nabawa.
H. A. Eckert, Belvidere—Sword.
C. Brook, Woodchester—Petatz Surprise, Nabawa.
H. H. Cross, Woodchester—Ford.
E. T. and L. Jaensch, Hartley—Ghurka, Bencubbin.
Mrs. E. Hartmann, Monarto South—Dan, Sword.
Thomas Bros., Monarto South—Nabawa, Sword.
P. B. Frahn, Monarto—Currawa.
Frahn Bros., Monarto—Sword, Nabawa.
J. F. C. Paech, Callington—Dan, Nabawa.
C. Brook, Woodchester—Comeback.

JUDGE'S NOTE.—*"Sword" contains the mixed strains typical of this variety, but because of its prominence and the demand for seed, it has been recommended until such time as a more fixed type is available.*

Seed Wheat—*continued.*

ALBERT—

G. H. Sutherland, Copeville—Ranee.

ALFRED—

W. Paull & Sons, Alawoona—Gallipoli, Ranee.
A. C. Webb, Paruna—Sword, Nabawa, Baringa.
G. J. Zimmermann, Meribah—Sword.
E. M. Edwards, Paruna—Ranee.

BALAKLAVA—

Jas. Campbell, Barabba—Sword and Ford.
J. A. Campbell, Barabba—Sword.
R. P. Anderson, Upper Wakefield—Sword.
W. Ryan, Halbury—Sword.
Bowyer Bros., Owen—Sword.
G. Uppill, Balaklava—Sword.
E. Munday, Barabba—Sword.
D. Wilson, Barabba—Ford.

WESTERN—

L. C. Roberts, Port Pirie—Currawa.
H. G. Munday, Merriton—Waratah.
E. T. Franks, Box 157, Port Pirie—Currawa.
J. H. Holman, Telowie Creek—Carmichael's Eclipse and Gallipoli.

SOUTHERN YORKE PENINSULA.

H. Polkinghorne, Minlaton—Sword.
W. G. Boundy, Minlaton—Ford.
A. E. Brechin, Curramulka—Sword.

MID-NORTH—

A. Maitland, Rochester—Nabawa.
F. J. Pedler, Koolunga—Sword, Rance, 4H, Bencubbin.
F. A. Wheaton, Redhill—Nabawa.
J. T. Clothier, Redhill—Sword.
A. H. Bentley, Redhill—Sword.
H. J. Crouch, Crystal Brook—Waratah.
J. D. Dennis, Redhill—Rance 4H.
J. L. Norman, Gulnare—Sword.

NOTHERN YORKE PENINSULA—

T. Rodda, Boors Plains—Sword.
J. H. Bussenchutt, Paskeville—Sword.
G. E. & H. M. Meier, Paskeville—Sword.

FAR NORTHERN—

H. G. Kupke, Morchard—Free Gallipoli.
A. Piggott, Morchard—Ford.
D. J. Crocker, Orroroo—Waratah.
W. G. Gregurke, Wepowie—Felix.
T. F. Orrock, Wepowie—Ranee 4H.
E. H. Hampel, Terka—Ranee 4H, Currawa.

LE HUNTE—

T. L. Nottle, Yaninee—Ford, Merridin.
E. H. Edmonds, Pygery—Nabawa.
S. C. Billinghurst, Minnipa—Felix, Faun, Early Gluyas, Merridin, Nabawa.
W. P. Bartley, Wudinna—Nabawa.

NORTHERN—

H. C. Jaeschke, Yandiah—Nabawa.
M. H. Burgess, Laura—Nabawa.
J. C. Kleinig, Laura—Sword.
W. F. Wurst, Laura—Nabawa.
J. W. Prior, Gladstone—Free Gallipoli, Nabawa, Sword.
W. S. Ballantyne, Gladstone—Sword.
W. M. Neate, Caltowie—Ford.

CROPS RECOMMENDED FOR SEED.

W. H. Prior, Hampden—Sword and Dan.
E. A. Pfitzner, Buchanan—Ranee.
E. J. Williams, Tothill's Creek—Ranee and Gallipoli.
S. Garrard, Farrell's Flat—Gallipoli.

Seed Wheat—*continued.*

H. Miller, Farrell's Flat—Ranee.
W. T. Ley, Farrell's Flat—Gallipoli.
J. L. C. Freebairn, Owen—Sword.
E. V. H. Wilsdon, Spalding—Dan.
T. Vogt, Saddleworth—Ranee 4H.
G. and C. Frost, Manoora—Gallipoli.
H. N. Pearson, Tarlee—Sword.
D. L. Clarke—Waratah and Sword.
R. Wake, Tarlee—Dundee.
F. Coleman, Saddleworth—Gallipoli and Ghurka.
H. Behn, Saddleworth—Sword.
W. H. R. Branson, Hamley Bridge—Sword.
R. and N. Hughes, Kapunda—Gallilopi.
Mrs. M. E. Glynn, Rhynie—Dan.
L. J. Harvey, Hilltown—Dan.
J. Ross, Mintaro—Waratah.
Molinaux Bros., Tarlee—Sword.
W. R. Woods & Sons—Gallipoli and Kerley's Early.
R. L. Blatchford, Mintaro—Waratah.
A. J. Jones, Manoora—Gallipoli.
W. J. Cornwall, Hilltown—Turvey and Dan.
L. A. Martin, Farrell's Flat—Dundee and Ranee 4H.
R. Roebuck, Buchanan—Mogul and Nugget.
J. H. Torr, Farrell's Flat—Gallipoli.
Geo. Hazel, Kapunda—Gallipoli and Ranee 4H.
C. J. H. Behn and Son, Riverton—Waratah and Nabawa.
L. V. Bell, Marrabel—Nugget.

Mr. Johnston also reports that he inspected the following crops which were not in the Competition, but have been recommended for seed:—

W. J. Branson, Hamley Bridge—Ford.
L. J. Harvey, Hilltown—Turvey.
L. V. Bell, Marrabel—Clarence, Waratah, Ranee 4H.
C. H. Behn and Sons, Riverton—Ghurka, Dundee, Sword, Baringa, Florence.

TATIARA—

L. Y. Langdon (Kongal), Bordertown—Gallipoli and Ranee.
H. C. M. Pilgrim, Wolseley—Gallipoli.
G. D. Butler, Wolseley—Ranee 4H.
Fisher Bros., Bordertown—Ranee.
F. V. Staude, Kongal—Gallipoli.
D. R. Milne, Bordertown, Ranee.
S. Pitcher. Bordertown—Ranee.
J. Smith, Bordertown—Ranee.
A. Klien, Mundulla—Bobin and Ranee.
C. Gall, Wolseley—Gallipoli.

Oats.

Mr. W. C. Johnston advises that he inspected a crop of New Zealand Cape Oats on the farm of Mr. F. H. Wolf, of Rosedale, which he reports as being suitable for seed.

Messrs. C. H. Behn and Son, Riverton—Calcutta Cape.
Kelly Bros., Wolseley—Algerian.
C. Gall, Wolseley—Algerian.
J. A. Sudholz, Kalangadoo—Algerian.
H. W. Walsgott, Mount Gambier—Mulga.
A. A. Sassanowsky, Mount Gambier—Algerian.
C. Mitchell, Mount Gambier—Algerian.
W. M. Harfull, Mount Gambier—Algerian.
F. L. Koop, Glencoe West—Algerian.
H. M. Kennedy, Glencoe West—Algerian.
Hilton Hinze, Mundalla—Sunrise.

Barley.

A. H. Allen, Mount Gambier—Plumage Archer.
V. Pettingill, Mount Gambier—Plumage Archer.
Smith Bros., Mount Gambier—Plumage Archer.
D. O. Norman, Mount Gambier—Plumage Archer.
Fisher Bros., Bordertown—Prior.
S. Pitcher, Bordertown—Prior.

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow July to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow July to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	6·60	4·73	5,040	763·63	2,081·93	236·71	35·86	102·79	4·70
7/L ..	30·73	25·27	24,266	666·27	2,770·21	1,066·40	29·29	121·96	4·39
7/P ..	26	24	18,090	695·77	3,414·42	875·81	33·69	164·21	4·84
7/Aa .	26	25·77	19,045½	732·52	3,015·46	850·22	32·70	134·05	4·46
7/Tt .	13·97	11·17	11,123	796·20	3,697·48	481·49	34·47	162·70	4·33
7/Uu	27·97	24·97	14,431	515·94	2,790·46	606·08	21·67	118·82	4·20
7/Xx	23	18·97	15,740½	684·37	3,055·09	840·70	36·55	160·33	5·34
7/Bbb	52·87	40·23	32,026½	605·76	2,839·12	1,451·66	27·46	125·62	4·53
7/Ccc	24·77	20·53	17,041	687·97	2,739·96	738·65	29·82	118·28	4·33
7/Ddd	13	12·17	9,310	716·15	3,228·33	463·67	35·67	156·52	4·98
7/Eee	9·80	7·80	5,763½	588·11	3,120·01	307·14	31·34	160·35	5·33
7/Ggg	17	13·03	7,519	442·29	1,756·51	335·22	19·72	80·10	4·46
7/Hhh	12	12	9,285	773·75	3,625·19	311·23	25·94	127·49	3·35
7/Iii .	16	16	17,445	1,090·31	3,681·47	581·54	36·35	127·60	3·33
7/Jjj	11·97	9·97	5,399½	451·08	2,471·89	266·55	22·27	118·10	4·94
7/Kkk	32·53	29·10	18,804½	578·06	2,394·65	948·67	29·16	120·88	5·04
7/Lll	21·03	19	13,470	640·51	2,847·99	710·59	33·79	144·63	5·28
7/Mmm	14	11·43	7,681½	548·68	2,075·09	415·89	29·71	107·06	5·41
Means	21·07	18·12	13,971·19	663·12	2,879·46	638·23	30·29	131·41	4·57

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow December to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow December to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18·93	17·93	10,798	570·42	5,874·28	523·92	27·68	283·81	4·85
6/C ..	21	17·53	17,441	829·31	6,041·88	711·45	33·84	253·40	4·08
6/H .	24	20	14,580	607·50	5,751·36	673·80	28·08	274·99	4·62
6/Y ..	14·80	6·03	5,256	354·80	4,350·63	199·96	13·50	182·84	3·76
6/Ii ..	20·77	11·53	9,590½	461·74	6,747·93	429·44	20·68	292·19	4·48
6/Ll .	24·97	16·40	15,715	629·35	5,690·18	545·07	21·83	213·72	3·47
6/Oo .	18·20	14·30	15,593	854·98	7,332·30	658·39	36·10	324·48	4·18
6/Pp .	14	11	9,165	654·61	6,021·31	398·00	28·43	296·50	4·34
6/Rr	27	17·80	19,944	738·67	7,886·74	824·12	30·52	331·76	4·13
6/Tt .	21·10	16·60	13,606½	644·05	7,466·15	548·54	26·00	328·16	4·03
6/Xx	26·67	21·17	21,306	798·87	6,922·96	860·38	32·26	299·68	4·04
6/Zz..	30	20·10	12,818	427·27	6,068·24	602·28	20·08	287·42	4·70
6/Bbb	23	17	14,535	631·96	7,197·75	570·68	24·81	309·12	3·93
6/Ccc	19·97	15·27	14,161½	709·14	6,386·80	579·95	29·04	266·73	4·10
6/Ddd	26·93	24·87	19,498	724·02	7,295·62	755·98	28·07	301·72	3·88
6/Eee	27	22·77	24,565	909·81	8,474·91	976·72	36·17	343·92	3·98
6/Fff	22·03	19·87	17,793½	807·63	7,830·51	692·76	31·45	321·51	3·89
6/Ggg	28	23·53	25,150	898·30	8,225·73	837·36	29·91	306·65	3·34
6/Iii .	24	15·57	12,385	516·04	7,625·00	501·11	20·88	311·94	4·05
6/Jjj	24·83	23·23	21,419½	862·64	7,461·63	958·67	38·61	342·93	4·48
6/Kkk	35·90	26·87	29,622	825·12	8,250·44	1,133·30	31·57	323·03	3·83
6/Lll	24·80	22·70	17,946	719·34	6,414·25	705·02	28·18	280·60	3·99
					May-Nov.			May-Nov.	
6/Mmm	9·40	8·13	9,359	995·64	6,137·48	355·57	37·83	233·47	3·80
Means	22·93	17·83	16,184·67	705·95	7,019·70	654·02	28·53	298·48	4·04

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow March to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow March to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	25·60	19·87	11,392	445·00	4,206·01	564·27	22·04	225·42	4·95
9/B ..	18·50	14·20	10,073½	544·51	3,643·56	458·04	24·76	171·65	4·55
9/C ..	12	11·03	9,118½	759·87	4,346·87	396·66	33·05	193·49	4·35
9/D ..	25·40	23	18,570	731·10	4,921·32	980·67	38·61	265·26	5·28
9/E ..	20	18	15,885	794·25	4,525·35	735·20	36·76	216·31	4·63
9/F ..	20	19·63	14,894	744·70	4,944·51	690·75	34·54	218·12	4·64
9/G ..	32·33	27·77	27,646½	855·13	4,336·53	1,423·46	44·03	227·76	5·15
9/H .	20	19·10	16,273½	813·68	6,211·29	690·68	34·53	268·88	4·24
9/I ..	36·27	36·27	26,948½	742·99	3,487·62	1,126·14	31·05	143·76	4·18
9/J...	61·70	44·07	28,004½	453·88	3,086·84	1,118·41	18·05	127·69	3·90
9/K .	24	21·70	11,749½	489·56	3,038·29	565·36	23·56	145·54	4·81
9/L ..	29	24·63	11,305½	389·84	3,321·49	446·36	15·39	129·99	3·95
9/M ..	19	18·33	10,405	547·63	1,404·94	462·75	24·36	61·95	4·45
9/N ..	37	29·43	17,125½	462·85	4,223·71	728·24	19·68	172·97	4·25
9/O ..	25	23·03	20,493	820·42	4,366·81	859·13	34·40	191·50	4·17
9/P ..	47	44·37	26,499½	563·82	3,712·08	1,188·89	25·30	170·12	4·49
					April-Nov.			April-Nov.	
9/Q ..	23·77	22·70	13,555½	570·28	3,373·76	614·15	25·84	158·56	4·53
9/R ..	8·13	7·90	7,599	934·67	3,524·33	388·73	47·81	171·18	5·12
					May-Nov.			May-Nov.	
9/S...	11·17	9·80	12,335½	1,104·30	4,449·70	515·36	46·14	193·08	4·18
9/T ..	21·37	19·37	15,737	736·40	4,581·22	706·25	33·05	210·80	4·49
9/U ..	15	14	10,005	667·00	3,298·59	566·65	37·78	176·27	5·66
					June-Nov.			June-Nov.	
9/V ..	10	9·97	4,695	469·50	2,761·65	268·39	26·84	148·17	5·72
					Sept.-Nov.			Sept.-Nov.	
9/W .	25·50	24	22,425	879·41	2,813·42	892·46	34·99	116·78	3·98
Means	24·68	21·83	15,771·13	638·91	4,117·25	712·26	28·86	188·16	4 52

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow October to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow October to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	32	28·20	15,918	497·44	1,098·93	835·03	26·10	57·87	5·25
5/D ..	30	28	15,030	501·00	1,140·12	842·49	28·08	60·87	5·61
5/E ..	38·90	35·20	25,030½	644·54	1,253·34	1,176·98	30·30	61·80	4·73
5/R ..	71·53	68·80	38,624	539·97	1,233·98	1,705·43	23·84	58·91	4·42
5/Z ..	32·67	32·67	25,297½	774·38	1,538·33	1,290·33	39·50	78·01	5·10
5/Ee .	23	23	14,625	635·87	1,333·54	705·39	30·67	63·30	4·82
5/Kk	16	10·60	10,197	637·31	1,222·68	453·08	28·32	58·26	4·44
5/Ww	20	19	9,330	466·50	1,107·75	437·11	21·86	52·58	4·68
5/Xx	20	19·73	13,090	654·50	1,317·90	674·14	33·71	67·08	5·15
5/Yy	11	11	5,865	533·18	1,196·22	284·60	25·87	59·86	4·85
5/Aaa	17	15·97	10,554	620·82	1,304·38	525·11	30·89	65·11	4·98
5/Bbb	17	16·37	10,764	633·18	1,303·33	514·01	30·24	64·27	4·78
5/Ddd	26	24·63	21,441	824·64	1,801·48	828·58	31·87	70·18	3·86
5/Eee	16·90	14·03	9,797½	580·30	1,170·41	458·35	27·13	54·35	4·70
5/Fff	10	9·87	7,705	770·50	1,475·25	347·74	34·77	67·39	4·51
5/Ggg	10	8·27	6,347	634·70	1,219·05	279·39	27·94	51·99	4·40
5/Hhh	14	13	11,535	823·92	1,608·96	436·20	31·16	63·13	3·78
Means	23·88	22·25	14,773·56	618·60	1,301·57	693·76	29·05	61·42	4·70

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934.	
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	163	
	2	156	
	3	29	348
	4	—	
	5	150	
	6	128	278
			626
A. H. Matthews, Bridgewater	7	130	
	8	134	
	9	144	408
	10	164	
	11	dead	
	12	45	209
			617
G. W. T. Symes, Echunga	13	143	
	14	28	
	15	158	329
	16	82	
	17	135	
	18	146	363
			692
E. B. Gliddon, Yundi	19	159	
	20	100	
	21	dead	259
	22	dead	
	23	80	
	24	59	139
			398
T. Cleaver, Bridgewater	25	136	
	26	100	
	27	92	328
	28	90	
	29	105	
	30	132	327
			655
J. E. Assender, Echunga	31	123	
	32	131	
	33	111	365
	34	82	
	35	97	
	36	83	262
			627
S. Hill, Bridgewater	37	148	
	38	84	
	39	205	437
	40	141	
	41	dead	
	42	109	250
			687
W. Restall, Echunga	43	165	
	44	174	
	45	dead	339
	46	128	
	47	125	
	48	137	290
			729

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 92th, 1934.	
C. Guthridge Yundi	49	144	
	50	164	
	51	141	449
	52	15	
	53	61	
	54	107	183
			632
S. Lambert, Echunga	55	144	
	56	28	
	57	dead	172
	58	39	
	59	116	
	60	109	264
			436
A. Young, Bridgewater	61	94	
	62	159	
	63	123	376
	64	151	
	65	132	
	66	157	440
			816
D. J. Foxwell, Echunga	67	154	
	68	135	
	69	112	401
	70	112	
	71	127	
	72	42	281
			682
J. C. Normandale, Yundi	73	116	
	74	151	
	75	144	411
	76	123	
	77	125	
	78	132	380
			791
L. W. Sando, Echunga	79	159	
	80	dead	
	81	122	281
	82	160	
	83	163	
	84	116	439
			720
J. O. Marshall, Yundi	85	163	
	86	189	
	87	52	404
	88	dead	
	89	141	
	90	125	266
			670
Murray Powell, Jupiter Creek	91	84	
	92	139	
	93	145	368
	94	dead	
	95	156	
	96	68	224
			592

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934.	
	97	134	
	98	157	
	99	136	427
S. Bridge, Yundi	100	94	
	101	dead	
	102	151	245
			672
	103	82	
	104	112	
	105	143	337
C. T. Rodger, Echunga	106	147	
	107	158	
	108	dead	305
			642
	109	34	
	110	13	
	111	171	218
R. H. Smith, Yundi	112	27	
	113	114	
	114	41	182
			400
	115	33	
	116	92	
	117	140	265
Willow Bend Stud Poultry Farm, North Walkerville	118	—	
	119	56	
	120	114	170
			435
	121	28	
	122	115	
	123	151	294
C. MacDonald, Echunga	124	159	
	125	132	
	126	105	396
			690
	127	175	
	128	96	
	129	dead	271
T. R. Smart Yundi	130	117	
	131	dead	
	132	154	271
			542
	133	75	
	134	132	
	135	143	350
Raymoor Poultry Farm, William Street Kilkenny	136	157	
	137	106	
	138	dead	263
			613
	139	90	
	140	128	
	141	195	413
B. R. Whittington Yundi	142	98	
	143	84	
	144	144	326
			739
	145	2	
	146	177	
	147	117	296
W. A. Hazeal, 11, Rosetta Street. Rosewater	148	dead	
	149	118	
	150	dead	118
			414
	151	46	
	152	85	
	153	82	213
H. F. Muirson, Yundi	154	62	
	155	133	
	156	109	304
			517
	157	3	
	158	126	
	159	105	234
K. Pennack, Pooraka	160	155	
	161	75	
	162	140	370
			604
	163	110	
	164	124	
	165	162	396
C. A. L. Sandstrom, Yundi	166	165	
	167	137	
	168	49	351
			747
	169	40	
	170	66	
	171	79	185
G. A. Bielby, Pooraka	172	130	
	173	dead	
	174	113	243
			428
	175	126	
	176	110	
	177	149	385
W. M. Field, Yundi	178	54	
	179	127	
	180	136	317
			702
	181	166	
	182	177	
	183	133	476
T. Duhring, Mallala	184	127	
	185	97	
	186	94	328
			804
	187	160	
	188	dead	
	189	59	219
W. R. Hedger Yundi	190	93	
	191	179	
	192	dead	272
			491
	193	138	
	194	150	
	195	118	406
A. & H. Gurr, Bradbury	196	162	
	197	168	
	198	160	490
			896
	199	154	
	200	90	
	201	116	360
J. V. McGinnis, Yundi	202	100	
	203	117	
	204	19	236
			596

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934.		
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	170		
	206	139		
	207	170	479	
	208	98		
	209	109		
	210	166	373	
				852
W. C. Jones, Yundi	211	7		
	212	94		
	213	166	267	
	214	109		
	215	139		
	216	51	299	
				566
Langmaid & Bettison, Parafield, Salisbury	217	dead		
	218	107		
	219	58	165	
	220	109		
	221	130		
	222	131	370	
				535
A. Jarvis, Yundi	223	69		
	224	104		
	225	60	233	
	226	137		
	227	111		
	228	167	415	
				648
S. Eyles, Clarendon	229	60		
	230	dead		
	231	139	199	
	232	148		
	233	160		
	234	121	429	
				628
Woodbury Poultry Farm, Stirling East	235	93		
	236	17		
	237	139	249	
	238	dead		
	239	59		
	240	78	137	
				386
V. F. Gameau, Findon Road, Woodville	241	63		
	242	6		
	243	106	175	
	244	dead		
	245	95		
	246	110	205	
				380
Geo. Lomax, Yundi	247	128		
	248	27		
	249	117	272	
	250	dead		
	251	dead		
	252	69	69	
				341
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	129		
	254	178		
	255	55	362	
	256	20		
	257	11		
	258	29	60	
				422
W. R. Williams, 28, Avenue Road, Frewville	259	189		
	260	78		
	261	dead	267	
	262	128		
	263	173		
	264	172	473	
				740
R. W. McAllister, Yundi	265	76		
	266	88		
	267	143	307	
	268	77		
	269	164		
	270	99	340	
				647
G. W. Sykes, Yundi	271	69		
	272	76		
	273	131	276	
	274	160		
	275	148		
	276	98	406	
				682
A. P. Urlwin, Balaklava	277	164		
	278	133		
	279	152		
		449		
A. V. Dupen, Melton Street, Glenelg	280	147		
	281	186		
	282	105		
		438		
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	97		
	284	174		
	285	131		
		402		
Thomas & Elson, Clifton Street, Hawthorn	286	122		
	287	63		
	288	122		
		307		
J. H. Dowling, Glossop, River Murray	289	104		
	290	157		
	291	147		
		408		
E. Pape, Wynarka	292	dead		
	293	27		
	294	104		
		131		
L. S. Ekers, Mount Jagged Farm Mount Compass	295	137		
	296	123		
	297	132		
		392		
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	150		
	299	164		
	300	166		
		480		
L. R. Badcock, 77, Findon Road, Woodville	301	90		
	302	80		
	303	120		
		290		

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	118	
	305	149	
	306	174	
		441	
Gallagher & Aslin, Pooraka	307	165	
	308	140	
	309	129	
		434	
R. C. Crittenden, William Street, Kilkenny North	310	158	
	311	130	
	312	81	
		369	
C. H. Lines, Junr., Gladstone	313	128	
	314	141	
	315	150	
		419	
A. J. Monkhouse Woodside	316	153	
	317	69	
	318	54	
		276	
B. Cooke, Kanmantoo	319	188	
	320	186	
	321	171	
		545	
Gallagher & Aslin, Pooraka	464	127	
	465	164	
	466	147	
		438	
W. C. Slape, Magill	467	110	
	468	135	
	469	dead	
		245	
Willow Bend Stud Poultry Farm, North Walkerville	474	179	
	475	7	
	476	159	345
	477	134	
	478	182	
	479	184	500
			845
Total Class 1. ...			35,438

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934.	
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	74	
	323	5	
	324	64	
		143	
G. Frisby Smith, Fulham (Minorcas)	325	—	
	326	111	
	327	142	
		253	

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934	
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	74	
	329	147	
	330	121	
		342	
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	83	
	332	168	
	333	120	
		371	
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	26	
	472	134	
	473	153	
		313	
Total Class No. 2.		1,422	
H. J. Mills, 108, Edward Street Edwardstown	334	162	
	335	92	
	336	158	412
	337	140	
	338	174	
	339	210	524
			936
A. G. Dawes Portrush Road, Glenunga Gardens	340	178	
	341	106	
	342	162	446
	343	130	
	344	114	
	345	137	381
			827
Willow Bend Stud Poutry Farm, North Walkerville	346	175	
	347	162	
	348	131	468
	349	136	
	350	50	
	351	71	257
			725
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	125	
	353	116	
	354	137	378
	355	86	
	356	168	
	357	126	380
			758
A. C. Byrne, 114, Rose Terrace, Wayville West	358	137	
	359	133	
	360	99	369
	361	112	
	362	75	
	363	103	290
			659
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	112	
	366	123	
		273	
C. H. Lines, jun. Gladstone	367	138	
	368	89	
	369	7	
		234	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive to Dec. 29th, 1934.	Totals
J. H. Dowling, Glossop, River Murray	370	63	
	371	113	
	372	dead	
		176	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	135	
	374	144	
	375	152	
		431	
Mrs. M. Specht, Holder Avenue, Richmond	376	165	
	377	144	
	378	140	
		449	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	105	
	380	133	
	381	67	
		305	
G. Frisby Smith, Fulham House, Fulham	382	154	
	383	33	
	384	90	
		277	
B. Cooke, Kanmantoo	385	179	
	386	148	
	387	153	
		480	
Willow Bend Stud Poultry Farm, North Walkerville	480	181	
	481	148	
	482	171	500
	483	97	
	484	151	
	485	154	402
			902
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	199	
	459	172	
	460	176	
		547	
Total Class No. 3.			7,979

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive to Dec. 29th, 1934.	Totals
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	119	
	389	142	
	390	77	338
	391	139	
	392	119	
	393	140	398
			736
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	127	
	395	165	
	396	179	471
	397	152	
	398	55	
	399	143	350
			821
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400	71	
	401	112	
	402	170	
		353	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	101	
	404	112	
	405	151	
		364	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	69	
	407	169	
	408	140	
		378	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	121	
	410	102	
	411	112	
		335	
K. Pennack, Pooraka (Barnevelders.)	412	154	
	413	131	
	414	164	
		449	
G. W. Lindsay, Torrens Road Kilkenny (Langshans.)	461	40	
	462	75	
	463	147	
		262	
Total Class No. 4.		3,698	

Class No. 5—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive to Dec. 29th, 1934.	Totals
A. O. Dawkins, Gawler	415	137	
	416	134	
	417	76	347
	418	147	
	419	172	
	420	160	479
			826
A. V. Dupen, Melton Street, Glenelg	421	56	
	422	dead	
	423	169	
		225	
A. J. Monkhouse, Woodside	424	170	
	425	148	
	426	153	
		471	
Total Class No. 5.		1,522	

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive to Dec. 29th, 1934.	Totals
A. C. Byrne, 114, Rose Terrace, Wayville West	427	89	
	428	101	
	429	117	307
	430	92	
	431	132	
	432	145	369
			676
G. Frisby Smith, Fulham House, Fulham	433	158	
	434	103	
	435	120	
		381	
Total Class No. 7.			1,057

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Dec. 29th, 1934.
Home Project Utility Section.—Wet Mash.		
John Plummer, Virginia School	436	139
Dudley Harper, Murray Bridge School	437	91
Jack Beauchamp, Murray Bridge School	438	103
Jack Beauchamp, Murray Bridge School	439	103
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	182
Stanley Pratt, Abattoirs School	442	157
Mervyn Steer, Sturt School	443	140
Donald Welford, Westbourne Park School	444	133
B. Zbierski, Gawler School	445	dead
J. McInerney, Gawler School	446	85
F. Martin, Gawler School	447	171
Darcy Coleman, Mallala School	448	133
Kevin Angus, Mallala School	449	65
Alwin Scott, Wellington Road School	450	138
Jack Dietman, Wellington Road School	451	124
Milton Smith, Salisbury School	452	162
Owen Robinson, Ascot Park School	453	118
Paul Mundy, Urrbrae High School	454	117
Max Couche, Thebarton School	455	172
Robert Swift, Murray Bridge School	456	184
Bruce Dooland, Thebarton Central School	457	23
Ian Slee, Two Wells School	470	123
Total		2,663

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED DECEMBER 29TH, 1934.—*FIRST GRADE EGGS ONLY.*

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	205	39
B. R. Whittington	195	141
W. R. Williams	189	259
J. O. Marshall	189	86
Trios—		
B. Cooke	545	319-321
Willow Bend Stud Poultry Farm	500	477-479
A. & H. Gurr	490	196-198
Teams—		
A. & H. Gurr	896	193-198
Gallagher & Aslin	872	307-309 and 464-466
A. G. Dawes	852	205-210

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	168	332
Langmaid & Bettison (Minorca)	153	473
V. F. Gameau (Minorca)	147	329
Trios—		
A. Heaysman (Cuckoo Leghorns)	371	331–333
V. F. Gameau (Minorcas)	342	328–330
Langmaid & Bettison (Minorcas)	313	471–473

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	210	339
F. F. Welford	199	458
Willow Bend Stud Poultry Farm	181	480
Trios—		
F. F. Welford	547	458–460
H. J. Mills	524	337–339
Willow Bend Stud Poultry Farm	500	480–482
Teams—		
F. F. Welford	978	373–375 and 458–460
H. J. Mills	936	334–339
Willow Bend Stud Poultry Farm	902	480–485

Class 4.—Any other Heavy Breeds.

All Rhode Island Reds.

Singles—		
A. G. Dawes	179	396
E. F. Snow	170	402
Woodbury Poultry Farm	169	407
Trios—		
A. G. Dawes	471	394–396
K. Pennack (Barnevelders)	449	412–414
A. G. Dawes	398	391–393
Teams—		
A. G. Dawes	821	394–399
A. G. Dawes	736	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—		
A. O. Dawkins	172	419
A. J. Monkhouse	170	424
A. V. Dupen	169	423
Trios—		
A. O. Dawkins	479	418–420
A. J. Monkhouse	471	424–426
Teams—		
A. O. Dawkins	826	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	158	433
A. C. Byrne	145	432
A. C. Byrne	132	431
Trios—		
G. Frisby Smith	381	433–435
A. C. Byrne	369	430–432
Teams—		
A. C. Byrne	676	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Robert Swift, Murray Bridge (Black Orpington)	184	456
Eric Pratt, Abattoirs (White Leghorn)	182	441
Max Couche, Thebarton (Rhode Island Red)	172	455
F. Martin, Gawler (White Leghorn)	171	447
Milton Smith, Salisbury (White Leghorn)	162	452

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to December 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to Nov. 30th, 1934.	No. Eggs Laid Month of Dec., 1934.	Total Eggs Laid April 1st, 1933, to Dec. 31st, 1934.
No. 1 test	12,101	676	12,777
No. 2 test	11,308	617	11,925
No. 3 test	10,960	591	11,551
No. 4 test	12,197	574	12,771
No. 5 test	6,296	415	6,711

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 10.—WILD ONION, OR ASPHODEL.

Asphodelus fistulosus, L.

The Wild Onion is an extremely common weed of roadsides, pastures, and other uncultivated ground. It occurs in all States of the Commonwealth, but is particularly well established in South Australia, where it forms some very dense growths, and in which it is a proclaimed noxious weed for the entire State. There are, however, within a short distance from Adelaide some large areas occupied by the weed to the almost complete exclusion of other pasture plants. The name "Wild Onion" is due to resemblances in habit and leaf-form to species of the true Onion (*Allium spp.*), and especially to the Shallot (*Allium Ascolonicum,* L.), which plants, since they belong to the same monocotyledonous family *Liliaceae,* further resemble the Asphodel in many structural details of the flower and fruit. Nevertheless the Asphodel is not a true Onion. The Onion-like habit of growth, in fact, is to be found in many members of the *Liliaceae* besides species of *Allium,* from which *Asphodelus* is easily distinguishable by the absence of bulb formation, by the arrangement of the flowers in racemes or panicles instead of in umbels, and by the absence of the characteristic odour and taste of onion or garlic present in most species of *Allium.* The Asphodel may be readily recognised by its very numerous, radical, dark-green, and cylindrical leaves, and by its erect racemes or panicles of white or pinkish flowers, each one of which has a pink or brownish stripe down the centre of each petal.

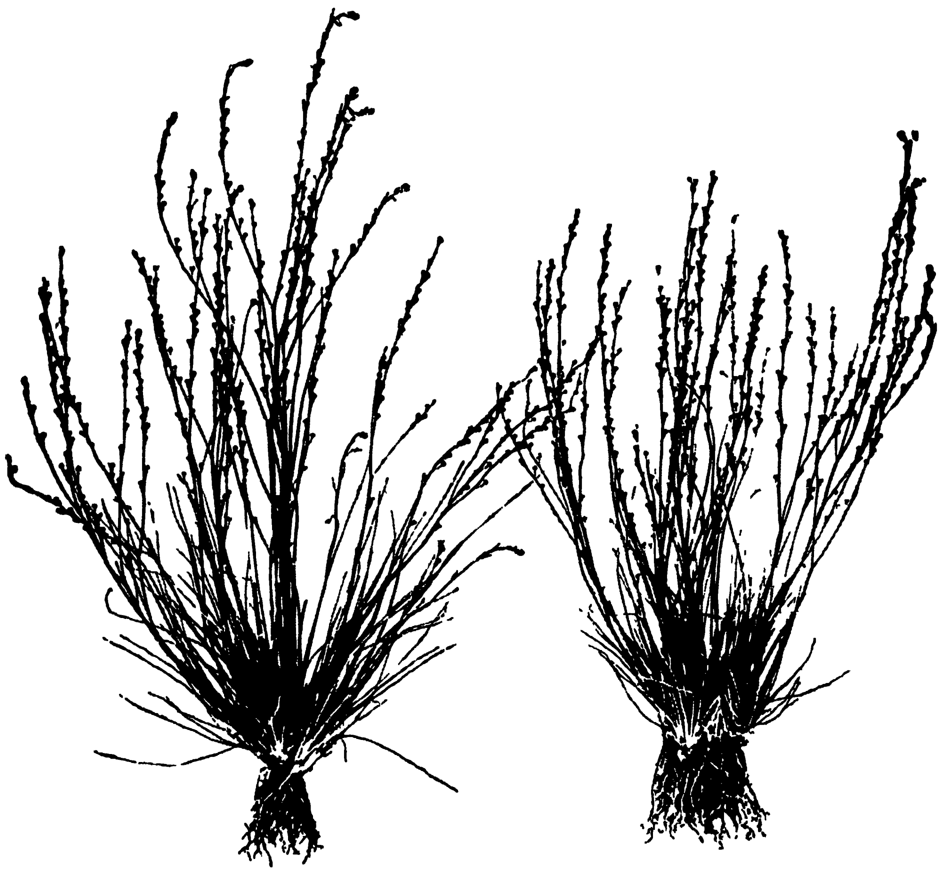
Botanical Name.—The name *asphodelos,* meaning "the head of a pike," was applied by the Greeks to some plant with awl-shaped leaves and belonging, probably, to the family *Liliaceae.* The species name *fistulosus* means "hollow," and is on account of the hollow stems and leaves of this species.

The Family.—The family *Liliaceae,* to which *Asphodelus* belongs, derives its name from the contained genus *Lilium,* and its members are often referred to as "Lilies," *e.g.,* Lily of the Valley (*Convallaria majalis*), &c. But the term "Lily" is more commonly applied to Arum Lily (*Zantedeschia aethiopica*), which belongs to the entirely different family *Araceae.* Similarly the Water Lilies (*Nymphaea* and its allies) are quite unrelated to Liliaceous plants.

The family includes a large assemblage of plants (about 250 genera and nearly 4,000 species), among which is to be found considerable diversity both as regards habit and habitat. The great majority are herbs with bulbs or underground stems, but there are some climbing members, a few large-leaved succulents, and a number of shrubs and trees. The Australian genus *Xanthorrhoea,* which includes the plants popularly known as "Black-boys," "Grass-trees," and "Yacca-gums," belong here. In fact, the family is rather well represented in Australia, there being no less than 40 genera and about 120 species native, of which 15 genera and 35 species occur in this State. In addition there are a number of introduced species, such as the plant under discussion, *Asphodelus fistulosus,* which belongs to the Mediterranean region.

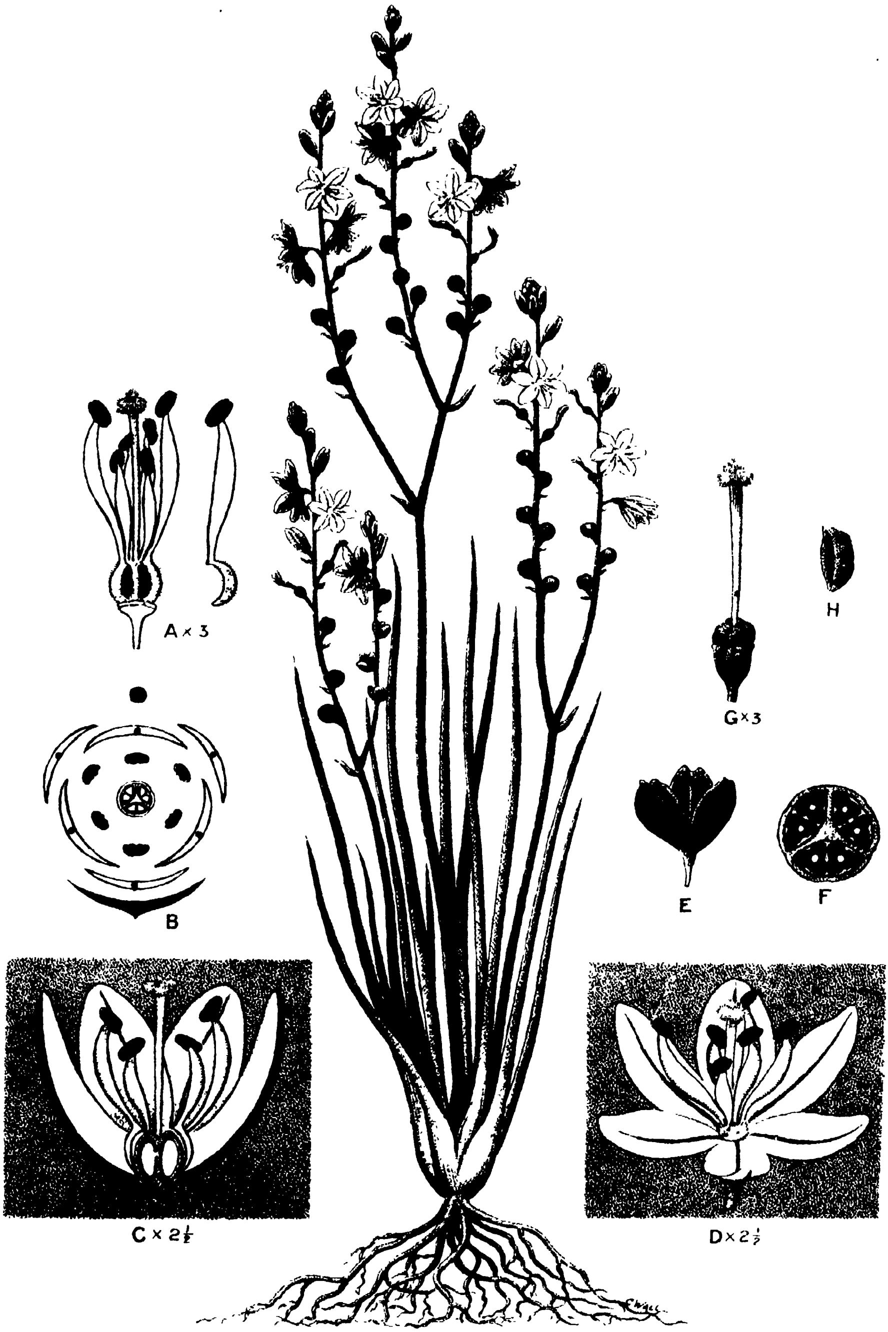
The economic importance of the *Liliaceae* is, on the whole, small, but some genera, *e.g., Allium* and *Asparagus,* are food plants; certain others are of medicinal value, *e.g., Smilax* (Sarsaparilla), *Urginea* (Squills), *Aloe* (Aloes), *Colchium,* and *Veratrum; Phormium* (New Zealand Flax) and *Yucca* yield fibre, while resin is obtained from *Xanthorrhoea.*

Despite the range of variation in habit there is a remarkably uniformity in the structure of the flower throughout the *Liliaceae*. With very few exceptions it is a radially symmetrical structure with an attractive perianth and nectar arrangements indicative of insect pollination. The parts of the flower are in threes, and there are five whorls, each whorl consisting of three segments. There are two whorls of perianth segments (petals), two of stamens, and a single one of three united carpels, the latter forming a superior pistil, of which the ovary contains three spaces or loculi, with a pair or double row of ovules arising from the inner angle of each. The fruit is in some cases a dehiscent capsule, and in others a succulent berry.



Wild Onion—Showing general habit and mode of branching at the base. A coloured plate of this weed is shown opposite.

An anatomical peculiarity which is found in certain tree-like types is the occurrence of secondary increase in the amount of conducting tissue in the stems, a process analogous to the cambial growth of other woody-species. Though a cambium in the strict sense is not present, there is formed in the outer part of the stem a layer of meristem which forms additional conducting strands outside those more centrally placed. Such meristem formation is unusual among *Monocotyledons* to which Liliaceous plants belong; a further departure from the usual monocotyledonous structure is seen in the climbing genus *Smilax*, which has net-veined instead of the more typical parallel-veined leaves.



WILD ONION (*Asphodelus Fistulosus L.*).

A.—Flower with perianth removed showing stamens and pistil.
B.—Diagram of flower. C.—Flower in vertical section.
D.—Flower seen from front. E.—Mature Fruit showing method of dehiscence.
F.—Cross section of fruit before dehiscence. G.—Pistil. H.—Seed.

H E POWELL GOVERNMENT PHOTOLITHOGRAPHER, ADELAIDE G H CLARKE, Direxit

The Genus.—The genus *Asphodelus* comprises about 12 Mediterranean species characterised by a non-bulbous habit and the possession of white, or reddish-white, flowers with the main vein of each petal conspicuously coloured. The stamens have their filaments expanded and curved at the base in such a way as to cover over the ovary (see coloured plate) and enclose it in a kind of sheath in which nectar accumulates. The ovary is superior and trilocular, and matures to form a capsular fruit with one or two seeds in each loculus. The *Asphodelus* flower is *protogynous,* that is to say, the pistil matures before the stamens, the ovules being already fertilised by the time the latter shed their pollen. Cross-pollination is thus assured. The species *fistulosus* is distinguished from other species by the relatively slender roots, which in other species are more or less swollen and tuberous, by the hollow and shorter stems, the narrow cylindrical leaves, three-lobed stigma of the flower, and by the small size of the fruit.

Description of A. fistulosus.—A glabrous perennial herb 20-60 cm. high, with numerous long only slightly thickened roots; stem hollow, simple or branching dichotomously towards the summit; leaves slender (1-3 mm. thick), semi-cylindrical, dark-green, inserted spirally at the base. Flowers white or flesh-coloured, small, in loose racemes; bracts whitish; perianth of six spreading segments, 8-12 mm. long, each with a pinkish or brownish stripe along the main vein; stamens six, filaments lanceolate and papillate at the base where they curve over the ovary; stigma three lobed; capsule globular, 4-6 mm. in diameter, wrinkled transversely, opening loculicidally; seeds 1 or 2 in each loculus, black, triangular, covered with irregular elevations and depressions. In flower, July-November.

Properties.—The Wild Onion is of no use, and, though not actually poisonous, is not eaten by stock. It is apt to take possession of large areas of uncultivated ground, so that these become practically useless for grazing purposes. Being perennial it holds its ground from year to year, and, besides forming large quantities of seed, it spreads by a method of branching suggestive of the tillering of cereals and other grasses, the stems branching at the base and so giving rise to the tufted habit which is so characteristic of older plants. The latter thus continue to grow each year, while new plants spring from seed formed each season, and if eradication measures are not undertaken the ground becomes densely covered with the weed in the course of a few years.

Yet the Wild Onion is not a difficult plant to eradicate, at least from small areas. It can be got rid of by hoeing or hand-pulling prior to the formation of seeds, the plants being easily uprooted since the root system does not penetrate the soil to a great depth. But if neglected it may become a serious pest on vacant land, as is actually the case in some areas where the land has been untouched for years. But once the weed has been got rid of by hoeing or cultivation, it only needs a little attention from time to time to keep the land free from it. On large areas it can be controlled by cultivation, though this, of course, means expense, especially when the earning capacity of the land is small.

Earning Capacity of Land and the Problem of Noxious Weed Control.—The subject of the earning capacity of land is important when considered in relation to the problem of controlling noxious weeds, and a few remarks thereupon may not be out of place here, since we are dealing with one of the commonest weeds to be found growing on vacant ground in and around the suburbs of Adelaide.

Legislation for the suppression of noxious weeds exists because we know that the unrestricted growth of such plants means financial loss both to individual farmers and pastoralists and to the State as a whole. This is obvious enough to the man on the land, who knows from his own personal experience that the trouble and expense incurred in preventing the growth of weeds is more than compensated for by the resulting improved earning capacity of the land. But

noxious weed control, in order to be effective, calls for concerted action, and so legislation is enacted to ensure that negligence on the part of a few is not allowed to undo the work of the many. So far so good. Unfortunately, however, legislation cannot accomplish miracles; and though such measures may be effective enough where economic conditions permit of their being carried out, there are, in certain situations, economic factors which operate in precisely the reverse way. This is particularly true in the case of land of which the earning capacity is small or none. Where the land is earning money, either as rent or from the sale of produce, the cost of weed eradication is recoverable and can be borne without pecuniary loss to the owners; in such cases the provisions of a Noxious Weeds Act are easily enforced and willingly carried out. But where the land is quite unproductive the cost of ridding it of weeds is not so recoverable; it becomes a tax on income from other sources, and so a financial burden which the owners are naturally unwilling, or perhaps unable, to bear. That legislation is far from being effective in such cases is evident from the often luxuriant growth of noxious weeds on this type of land.

It may be contended that the land in question should be made productive, and that legislative compulsion provides the necessary stimulus to this end. Such a view, however, is doubtless quite mistaken, even if it be conceded that such land can be made productive, which is not always the case. Apart from the circumstance that much of this land might be quite unsuitable for the growth of useful crops owing to high salinity or other causes, the important fact is that there will always be, on the outskirts of a growing city, a certain amount of land with a very small earning capacity. Such land constitutes a "wide border" between the agricultural area, which is continually receding, and the suburban or manufacturing area, which is continually advancing in its wake. Only rarely does a single line of fence separate a farm from a suburban garden, or from a factory; the border is not narrow, nor is it of uniform width; there is usually a perceptible interval, several miles perhaps in width, between the advancing lines of suburbs and the retreating line of farms, and it consists of land which has gone out of cultivation and which will eventually become incorporated in the suburbs as the city area expands.

It is easy to visualise what happens; the initial settlement is surrounded by farms, and, as the village grows into a town, the agricultural area gradually spreads outwards, pushing before it the pastoral areas, the land nearest the town being that longest in cultivation. With further growth of the town the adjacent land becomes too valuable for agricultural purposes and goes out of cultivation, the process extending outwards; moreover, the land, as a result of repeated cropping, becomes deficient in certain mineral nutrients, and, with improved facilities and reduced costs of transport, it becomes more profitable for farmers to move further afield and to take up virgin land than to recondition the more or less exhausted land near the city, in the face of the rising capital value of the land due to its proximity to the city and its prospective value for residential purposes. For various reasons, therefore, this land, exhausted of much of its mineral nutrients, comes to lie idle. Such land now has a prospective value only; it has no present earning capacity, but will have such capacity in the future. Its future worth is purely conjectural, and it may have to lie idle for

10 or 20 years or longer before it becomes capable of earning anything more than a few shillings annually for agistment purposes. Land of this type is purchased as an investment pure and simple, and it is held until such time as it becomes possible to subdivide and sell for residential or manufacturing purposes.

Large areas of such land will be found on the outskirts of any growing city, and will be connected by more or less radial strips with smaller areas situated in the more densely populated suburban parts. These lands form veritable nurseries for the growth of noxious weeds, and they present a serious obstacle in the way of the State-wide control of such plants. And what is true of capital cities is true, in diminishing degree, of larger and smaller country towns, so that there are similar, though smaller, "nurseries" dotted throughout the length and breadth of the State. The eradication of noxious weeds from such areas is obviously a matter of vital importance for the successful control of weeds on a State-wide basis, but it presents some very difficult problems which have their origin in the simple fact that the cost of weed eradication is not recoverable from the land itself, since the latter has only a prospective value and is devoid of present and actual earning capacity. And it would be difficult to find a weed more at home in such situations than the Wild Onion, or *Asphodelus fistulosus.* Here is a plant declared to be noxious for the entire State; yet, in spite of the legislative strictures placed upon it, and in spite of the conscientious efforts of landholders and district councils to check its growth on farms and roadsides, it is to be found growing in the greatest abundance on the outskirts of the suburbs of Adelaide, where it continues to reign supreme over hundreds of acres of land of the type referred to.

THE VALUE OF HEDGES AND THE KAFFIR APPLE (*Aberia Kaffra*) AS A HEDGE PLANT.

[By E. W. PRITCHARD, Dip. Econ., Agricultural Botanist].

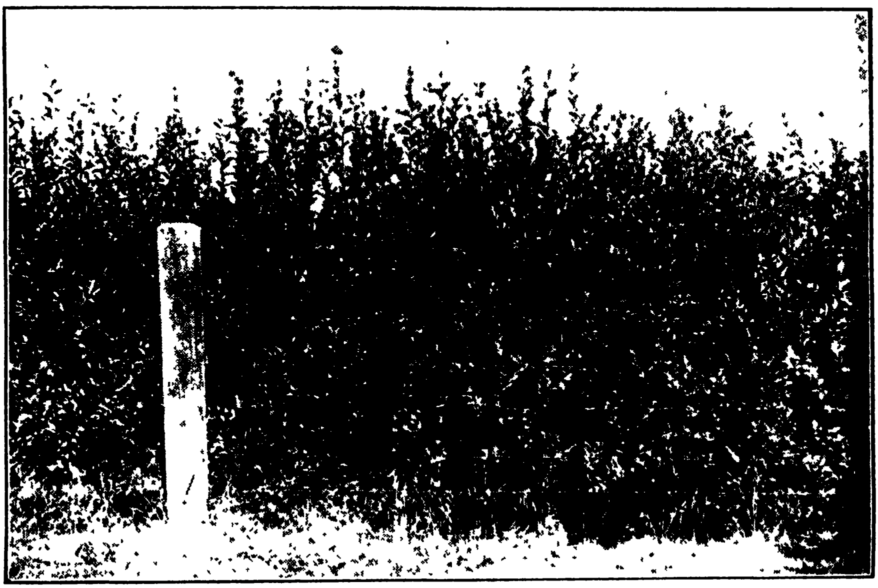
It does not seem to be generally recognised in Australia that the hedge has a very definite place in farm economy. In older countries it has always had its special uses. Among these are, first, the saving of fencing, a very valuable consideration in the days before fencing wire was invented, and still of considerable practical importance. Second, perhaps, comes the matter of shelter for stock

A single shoot of Kaffir Apple, 2ft. long, showing dark, shining leaves and long, sharp prickles.

from cold winds. And, third, the beautifying of the countryside with green shrubs and their flowers. Then as a subsidiary advantage, which has only recently been recognised, there is the provision of cover and nesting places for insect-eating birds.

Notwithstanding that Australian conditions are in most cases very different from those of England, all these reasons for the growing of hedges apply, more or less, to our own country. Indeed, in the early days of settlement, when farm operations were conducted on a small scale, hedges were extensively planted, as seen at Glenelg and Brighton and in the older hills districts, such as Mount Barker. But when through the invention of large and efficient wheat-producing machinery, farming in Australia became extensive instead of intensive, the hedge was more or less dropped out of farming practice.

Let us take the uses enumerated above and apply them to Australian conditions. The first matter of saving fencing was not of great importance in the early days because timber was plentiful and only the wire had to be bought. But even then labour was an expensive item, and again posts have a regular and incurable habit of wearing out. To-day, on the other hand, both wire and posts have usually to be bought, and labour for erecting is still dear. So, if with a little more expense, a permanent hedge can be established which will effectively restrain stock and will not need renewing, it should surely be a good proposition, even from the econmic point of view.



A young Kaffir Apple Hedge, showing dense, strong growth.

The question of shelter is even more important. For while the winter winds which sweep across our bare, open plains may not be so cold as in England, they are drier and, therefore, just as effective in reducing the temperature of the animal's body. Thus a larger amount of the food of farm stock is consumed in keeping the body warm and less goes towards productive uses. Also young stock of all classes are stunted and weakened and even killed by such conditions.

Besides this winter result, there is to be considered in Australia the annual drift of the fallows in all dry farming districts. How well we know the South Australian "brick-fielder," when some of the most valuable constituents of our northern wheat fields are lifted high in the air to be deposited away out at sea or on the shining cups and saucers of the exasperated city housewife. Surely, properly placed hedges could prevent a great deal of this irreparable waste.

The third use is, of course, a sentimental one, but yet important in making country life more refined, more varied, and more enjoyable. What can be more

dreary and uninviting than a farm which consists merely of a group of buildings surrounded by bare fallow or crops in winter, and fallow and dry grass in summer, with wire fences and iron gates for ornament. Such things were excusable, no doubt, in the early days when every farmer was busy getting his land cleared and in working order, but surely they should no longer be tolerated.

As for the last use, there is surely no country in the world which needs to conserve its bird population more than Australia. Few of our native birds were fitted to survive under the entirely new environment which had been so suddenly thrust upon them, giving them no time to adapt themselves to the new conditions. So we should surely make the best of what insect-eating species we have left and also of the few useful introduced varieties, such as the Blackbird.

A single Kaffir Apple Bush about 5 years old and 8ft. high.

Suitable Plants.

Coming now to the many varieties of plants which have been tried for hedges, there are not many which are suitable for economic planting on farms in South Australia. The properties required for general and extensive planting from a utility point of view, I would enumerate as follows:

The plant should be hardy; it should be easily propagated and quickly established. It should be strong growing and should be protected from stock by spines or prickles and should require little cutting. And perhaps, most of all, it should not have the power of spreading spontaneously.

For the cooler and moister parts of the State, notably, the Mount Lofty Ranges, the plant which fulfils these conditions best appears to be the Hawthorn. This plant is so generally known and so widely used that it needs no description here. Its only disadvantage is that it does spread in uncultivated land to some extent, but not nearly so quickly as some others, such as the Furze.

The case is quite different, however, on the plains and in the wheatgrowing areas generally. The African Boxthorn was first tried and proved quite suitable, excepting for one point; it spreads rapidly on all uncultivated lands, the seed being carried far and wide by birds, which feed on the berries. It has indeed spread so quickly that it has been necessary to place it on the list of Declared Noxious Weeds.

It is as a substitute for the Boxthorn that the Kaffir Apple should find a place on all farms in the wheatgrowing areas and on much of the pasture country. It has been grown in South Australia for at least 30 years and has proved itself to be entirely suited for the purpose. It exhibits all the desirable qualities stated above. The plant is a strong growing shrub, which reaches a height of about 15ft., the shoots giving off at intervals strong, sharp, woody spines. The leaves are dark green and shining, giving it a fresh, bright, pleasing appearance throughout the whole year. It also produces a yellow "apple," about 1in. in diameter and a perfect sphere in shape, which is edible and makes quite good jam. It is easily propagated by extracting the seeds from these fruits, planting them in drills in the autumn about ½in. deep, and covering with leaf mould. The young plants will come through the soil in early spring and should be watered occasionally during summer. Most of them will be ready for planting out in the autumn following and should be set out about 3ft. apart. The soil round the young hedge should then be kept cultivated for two or three years, and it should also be protected from stock until the plants are well grown. There are many old established hedges round the city from which a supply of the "apples" could be obtained, or the seed can be bought from city seedsmen.

Thus we have, in a few years, a dense hedge, not too broad, even if left uncut, spreading well at the bottom and quite high enough for protection from wind and beating rain, and for most of the day from the sun. As to the danger of spreading, I have never seen a specimen anywhere that has not been planted by hand.

In conclusion, let me emphasise the need for providing some such shelter for all farm animals. A beginning could be made by planting a short line of hedge along each of the two fences in four corners of the paddock. By this means some shelter would always be available which ever way the wind may be blowing. From such a beginning planting could be gradually extended until the whole farm is, shall we say, fully "hedge conscious."

RESULT OF WHEAT CROP COMPETITIONS: SEASON 1934-35.

FLINDERS CROP COMPETITION, 1934.

Judged by H. D. ADAMS, R.D.A., District Agricultural Instructor.

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
1	W. H. Watkins, Yeelanna	L. Gluyas ..	34	23½	19½	14	4	95
2	T. R. Secker, and H. O. Clements, Yeelanna	Waratah ...	33	23½	18½	14	4½	93½
3	R. R. Wilson, Yeelanna	Ford	31	24	19½	14	4½	93
3	G. & H. Laurie, Ungarra	Ford	31	24½	19½	13½	4½	93
3	Smith Bros., Yeelanna	Sword	32	24	18½	14	4½	93
6	G. & A. Laurie, Ungarra	Sword	31	24½	18	14	4½	92
7	T. R. Secker & H. O. Clements, Yeelanna	Nabawa	30	24	19	14	4½	91
8	R. R. Wilson, Yeelanna	Gresley and Sword	30	23½	19	13½	4½	90½
9	W. H. Watkins, Yeelanna	Ford	30	23½	19	13½	4	90
10	J. Pedler, Yeelanna ..	Waratah ...	27	24	19	14	4½	88½
10	H. Solly, Louth Bay..	Currawa	30	23	18½	13	4	88½

TATIARA WHEAT CROP COMPETITION, 1934.

Judged by E. S. ALCOCK, R.D.A., District Agricultural Instructor.

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	L. Y. Langdon, Kongal	Gallipoli	34	24	17½	14	4½	94
2	L. Y. Langdon, Kongal	Ranee	33	24	18	13½	4½	93
3	H. C. M. Pilgrim, Wolseley	Gallipoli	34½	22½	17	15	3½	92
4	G. D. Butler, Wolseley	Ranee 4H ...	32½	23½	18	14	4	92
5	Fisher Bros., Bordertown	Ranee	33	22½	17½	15	3½	91½
6	F. V. Staude, Kongal .	Gallipoli	31	24	18	14½	3½	91
7	D. R. Milne, Bordertown	Ranee	32	22	18	14	3½	89½
8	H. C. M. Pilgrim, Wolseley	Gallipoli	33	21	17	15	3	89
9	S. Pitcher, Bordertown	Ranee	32	20½	18	14	4	88½
9	E. L. Milne, Mundalla	Gallipoli and Ghurka	32	21	18	13½	4	88½
9	J. Smith, Bordertown..	Ghurka	32	21	19	13	3½	88½
12	F. Grosser, Mundalla..	Gallipoli and Ranee	32	21	18	13	3½	87½
13	J. Smith, Bordertown..	Ranee	31	20	17	14	3½	85½
14	C. Gall, Wolseley.....	Gallipoli	32	19	17	13	3½	84½
15	H. C. M. Pilgrim, Wolseley	Ghurka	32	19	17	12	3	83
16	E. W. Sharrad, Wolseley	Gallipoli	30	19	17	12	3	81

RESULT OF WHEAT CROP COMPETITIONS—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	CHANDOS DISTRICT WHEAT CROP COMPETITION, 1934.							
	Judged by R. L. GRIFFITHS, D.D.A., District Agricultural Instructor.							
1	F. H. Whittlesea, Jabuk	Sword	32	23½	18	14	4½	92
2	C. W. Rundle, Lameroo	Gallipoli	32	22½	19½	14	3½	91½
3	H. A. V. Steer, Lameroo	Felix	28½	24	19	14½	4½	90½
4	E. Ross, Parrakie	Sword	30	23	17½	14	4	88½
5	H. A. V. Steer, Lameroo	Waratah ..	27½	22½	19	14	5	88
6	H. F. Johnson, Parilla	Waratah ...	26	24	19½	14½	3½	87½
6	C. H. E. Hentschke, Lameroo	Sultan	29	23½	16½	14	4½	87½
8	A. Y. Knight, Geranium	Sword	26	23	19½	14	4½	87
9	A. J. Beelitz, Parrakie	Waratah ...	27½	23	17½	14	4	86
10	C. O. Schumacher, Parilla	Ranee	26	23½	18	14	4	85½
10	P. Ross, Parrakie	Sword	26	22	19	14	4½	85½
12	J. H. and C. H. Spratt, Lameroo	Gallipoli	24	23½	19	14	4½	85
13	Young & McInerney, Pinnaroo	Waratah . .	23	22½	18½	14½	5	83½
13	C. W. Neindorf, Parilla	Major	22	23½	19½	14	4½	83½
15	R. M. Neindorf, Parilla	Bobin	21	24	19	14½	4½	83
15	A. Hayward, Lameroo	Ranee and Gluclub	26	22½	18	12½	4	83
17	A. U. Burman, Carina	Ranee and Gallipoli	22	23½	18½	14	4½	82½
18	H. L. Badman, Pinnaroo	Sword and Gallipoli	21	23	19	14½	4½	82
19	R. J. Billing, Pinnaroo	Ghurka and Ranee 4H	23	21	20	13½	3½	81
20	Young & Blacksell, Pinnaroo	Bobin and Ranee 4H	21	22½	19	14	4	80½
20	J. H. and C. H. Spratt, Lameroo	Gallipoli	22	22	17½	14	5	80½
20	J. L. Koch, Lameroo .	Waratah ...	22	21½	19	14½	3½	80½
23	D. A. Wurfel, Pinnaroo	Gallipoli	21	21½	19	14	4½	80
23	A. Afford, Parrakie ..	Waratah ...	22	22½	18½	14	3	80
25	F. A. Meagher, Carina	Gallipoli	20	21	19½	14	5	79½
26	H. S. Angel, Pinnaroo	Gallipoli	20½	21	18½	14½	4½	79
27	A. J. A. Koch, Lameroo	Ranee	20½	21	18	14	4½	78
27	A. Afford, Parrakie ..	Nabawa	19½	23	19	13½	3	78
29	Mattiske Bros., Pinnaroo	Ranee 4H ..	18	22	18½	14½	4½	77½
30	W. A. Kelly, Pinnaroo	Gallipoli and Ghurka	18½	22	18½	13½	4½	77
30	J. Churches, Parilla	Waratah	21	20	19	14	3	77
32	L. Fischer, Pinnaroo..	Gallipoli and Ghurka	16	21½	19½	13½	4½	75
33	E. Venning, Pinnaroo.	Rajah and Ghurka	16	23½	17	14	4	74½
34	H. G. Fewings, Pinnaroo	Bobin	16	21½	18½	14½	3½	74
35	Foale & Sons, Parilla	Gallipoli	17	20	19	14	2½	72½
36	C. & L. Fischer, Pinnaroo	Gallipoli and Ranee 4H	15	21½	17½	14	4	72
	JUNIOR ENTRIES.							
1	R. M. Neindorf, Parilla	Bobin	21	24	19	14½	4½	83
2	A. W. Blacksell, Pinnaroo	Gallipoli	22	21½	19	14	4	80½
3	A. G. Johnston, Pinnaroo	Ranee	18½	20	20	14	4	76½

RESULT OF WHEAT CROP COMPETITIONS—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	MIDLAND CROP COMPETITION, 1934.							
	Judged by W. C. JOHNSTON, R.D.A., District Agricultural Instructor.							
1	P. McD. Smyth, Salters Spring	Sword	35	24	18	14	4	95
2	Mrs. M. E. Glynn, Rhynie	Dan	33½	23	18½	14	4	93
3	W. R. Woods & Sons, Wirrilla	Gallipoli	33	22½	18	14	4	91½
4	R. G. Townsend, Saddleworth	Sword	34	23	16	14	4	91
5	F. Coleman, Saddleworth	Gallipoli	32	23	18	13½	4	90½
6	G. R. Woods, Wirrilla	Kerly's Early	32	23	18	13	4	90
7	J. Ross, Mintaro	Waratah ...	29½	23	19	14	4	89½
8	J. Ross, Mintaro	Sword	31½	23	16	14	4½	89
9	W. J. Cornwall, Hilltown	Dan	29	23	18	14	4½	88½
10	T. Vogt, Saddleworth	Ranee 4H ..	30	22	17½	14	3½	87
11	Molineaux Bros., Tarlee	Sword	26	24½	19	13	4	86½
12	A. S. Woods, Mintaro.	Ranee	28	22	17½	13½	4	85
12	F. Coleman, Saddleworth	Ghurka	27	22	19½	12	4½	85
14	A. J. Jones, Manoora	Gallipoli, Waratah, and Sword	26	22	19	14	3½	84½
15	W. J. Cornwall, Hilltown	Turvey	28	23	17	12	4	84
15	A. L. Sandow, Mintaro	Sword	28	22	16	14	4	84
15	W. H. R. Branson, Hamley Bridge	Sword	24½	24	18½	13	4	84
15	A. T. Hill, Tarlee	Sword	26	22½	18	13½	4	84
19	H. Michael, Hilltown .	Dan	25	21½	19	14	4	83½
19	R. F. Thomas, Hallett	Gallipoli	24	23	18	14	4½	83½
19	F. and N. Hughes, Kapunda	Gallipoli	24½	22	19	14	4	83½
19	Geo. Hazel, Kapunda	Ranee 4H and Gallipoli	24	24	18	13½	4	83½
19	L. A. Martin, Farrell's Flat	Ranee and Dundee	25	23½	18	13	4	83½
24	R. L. Blatchford, Auburn	Waratah and Sword	27	21½	17	13½	4	83
24	L. J. Harvey, Hilltown	Dan	23	24	18	14	4	83
26	L. W. Blatchford, Auburn	Sword	26	22½	16	14	4	82½
26	H. Thomas, Manoora .	Gallipoli	25	22	17½	14	4	82½
26	S. H. Kelly, Riverton	Sword	26½	22½	17	13	3½	82½
26	C. J. H. Behn & Son, Riverton	Nabawa and Waratah	26½	22½	17	13	3½	82½
26	H. Shunke, Manoora .	Gallipoli	25	22	18½	13½	3½	82½
31	R. F. Thomas, Hallett	Gallipoli	23	22	18½	14	4½	82
31	S. Howard, Stockport..	Sword and Ranee	26	21	18½	12½	4	82
31	W. H. Brown, Alma .	Sword	24	24	17	13	4	82
31	A. T. Hill, Tarlee	Sword	24	23	17	14	4	82
31	H. N. Pearson, Tarlee..	Sword	25	21	18	14	4	82
31	E. V. H. Wilsdon, Spalding	Dan	25	22	18	13	4	82

RESULT OF WHEAT CROP COMPETITIONS—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	MIDLAND CROP COMPETITION, 1934—*continued.*							
37	C. J. Lake, Owen	Sword and Ford	24½	23	17½	12½	4	81½
37	H. Miller, Farrell's Flat	Ranee	23½	23	18	13	4	81½
37	S. Garrard, Farrell's Flat	Gallipoli	23½	23	18	13	4	81½
37	R. F. Wake, Tarlee ..	Dundee	24	23½	18	13	3	81½
41	G. & C. Frost, Manoora	Gallipoli	23	23	18½	13	3½	81
41	Cornwall & Crawford, Saddleworth	Sword and Waratah	24	23	17	13	4	81
41	D. L. Clarke, Tarlee ..	Sword and Waratah	21	23	19	14	4	81
44	L. & K. Bagshaw, Saddleworth	Gallipoli	23	21	18	14	4½	80½
44	D. W. Kelly, Riverton	Sword	24	22	16	14	4½	80½
44	Ross Starkey, Farrell's Flat	Gallipoli	24	21	17½	14	4	80½
47	Chas. McDonald, Hallett	Gallipoli	23	22	18	13½	3½	80
48	A. Evans, Wirrilla ...	Ranee and Waratah	21	22	19	13	4½	79½
48	R. Roebuck, Eudunda	Mogul and Nugget	21½	22½	18½	13	4	79½
50	G. Miller, Farrell's Flat	Gallipoli	21	22	18½	14	3½	79
50	J. H. Torr, Farrell's Flat	Gallipoli	22	22	18	13	4	79
50	E. A. Scarfe, Wirrilla .	Sword	23	23	16	13	4	79
50	E. J. Williams, Tothills Creek	Ranee	23	22	17	13	4	79
50	F. Behn, Riverton ...	Clarence, Waratah, and Gallipoli	25	22	16	12	4	79
55	J. T. Shattock, Hallett	Gallipoli and Dan	22	22	17½	13	4	78½
56	W. T. Ley, Farrell's Flat	Gallipoli	21	22	18	13	3½	77½
57	Chas. McDonald, Hallett	Dan	22	21	16	14	4	77
57	C. A. Heinrich, Black Springs	Gallipoli and Sword	21	23	16	13	4	77
57	J. T. L. Freebairn, Alma	Sword	20	22	18	13	4	77
57	O. S. Smith, Stockport	Sword	23	22	17	11	4	77
57	E. J. Williams, Tothill's Creek	Gallipoli	21	22	17	13	4	77
62	W. Prior, Hampden ..	Sword and Dan	22	20	17	13	4	76
63	E. A. Pfitzner	Ranee and Baldmin	19½	22	18	13	3	75½
64	H. Behn, Saddleworth	Sword and Waratah	19	21	17	14	4	75
64	—Michalanney, Owen	Ranee	22	21	17	12	3	75
64	W. J. Armstrong, Buchanan	Sword and Gallipoli	21	20	16	14	4	75
64	W. Prior, Hampden ..	Sword and Dan	20½	21	16	13½	4	75
64	L. V. Bell, Marrabell .	Nugget, Bobin and Dan	19	22½	18	13	3½	75
64	H. Reudiger, Buchanan	Sword and Pleuckhahn's Sel	19	22	19	11	4	75

RESULT OF WHEAT CROP COMPETITIONS—*continued.*

Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	NORTHERN DISTRICT WHEAT CROP COMPETITION, 1934. Judged by E. L. ORCHARD, R.D.A., District Agricultural Inspector.							
1	W. F. Wurst, Laura .	Nabawa	33	23	19	14	3	92
2	J. W. Prior, Gladstone	Nabawa and Sword	32	23	19	14	3½	91½
3	O. Pech, Laura	Turvey and Sword	32½	22½	18	13	4	90
4	J. W. Prior, Gladstone	Free Gallipoli	32	22	18½	14	3	89½
5	J. E. A. Pech, Laura..	Geeralying Merridin Sword	30	24	17	14	3	88
6	J. C. Kleinig, Laura .	Dundee and Sword	31	22	19	12½	3	87½
7	A. D. Bray, Belalie North	Sword	30	23	17	13	4	87
8	W. S. Ballantyne, Gladstone	Sword	29	22½	19	13	3	86½
9	Blesing Bros., Gladstone	Ford	31	22	17	13	3	86
9	M. H. Burgess, Laura	Nabawa and Sword	29	22	19	13	3	86
10	W. M. Neate, Caltowie	Ford	30½	22	17	14	2	85½
12	H. C. Jaeschke, Yandiah	Nabawa	28	22	19	14	2	85
12	J. A. Coe, Gladstone..	Early Gluyas	29	22	19	13	2	85
14	A. J. Symonds, Jamestown	Nabawa and Sword	30	21	17	13	3½	84½
15	J. A. Coe, Gladstone .	Nabawa	28	22	19	13	2	84
15	O. Schumann, Gladstone	Nabawa	30	21	17	13	3	84
17	P. Curtin, Beetaloo Valley	Nabawa	29½	21	17	13	3	83½
18	Avery & Sons, Jamestown	Ranee	30	22	16	12	3	83
18	F. G. Baltrum, Beetaloo Valley	Sword	29	21	17	13	3	83
20	J. Halse, Beetaloo Valley	Sword	29	22	16	13	2½	82½

SOUTH AUSTRALIAN COMMITTEE OF AUSTRALIAN DAIRY COUNCIL.

REPORT OF SOUTH-EASTERN PASTURE COMPETITION, 1934.

[Judged by E. S. ALCOCK, R.D.A., District Agricultural Instructor.]

The South Australian Committee of the Australian Dairy Council again arranged a Pasture Competition for dairymen who milk seven cows or more. The idea of these competitions is to encourage dairymen to pay more attention to the management of their pastures.

This year seven (7) entries were received and these were judged between the 15th and 23rd November, 1934. The entries were situated at Hynam, Robe, Hatherleigh, Rendelsham, Allandale, and Mil Lel, the land in these districts varying from

ironstone, gravelly loam to light limestone loam and peaty soils, which are found in reclaimed swamps. With such differences in soil type and also considerable variation in the climatic conditions, it is not easy to inspect all of the entries when they are in their best stage of development, since those at the lower end of the South-East and in lower lying situations are not at their best early in the season.

The closing date for the entries was rather late for those at the northern end of the district and probably a little too early for those in the later districts. All entries, however, were sown with different forage crop seeds and had been top dressed with phosphatic manures. These entries were judged according to the following schedule of points:—

	Points.
Bulk of pasture available per unit of area	30
Quality of pasture	25
Freedom from useless plants	20
General care and management	15
Area	10
Total	100

The points awarded to each competitor in detail are given below:—

Name and Address.	Position.	Bulk of Pasture Available. 30	Quality of Pasture. 25	Freedom from Weeds. 20	Care and Management. 15	Area. 10	Total. 100
A. C. Kemp, Hatherleigh	1	29	24	19	13	10	95
Mrs. G. D. Stuckey, Rendelsham	2	28	24	18	12	10	92
J. M. Wray, Hynam	3	26	23	18	13	9	89
Mrs. G. D. Stuckey, Rendelsham	4	27	23	17	11	10	88
R. J. Wokey, Robe	5	26	22	19	14	6	87
W. M. Laslett, Allandale	6	26	21	17	13	10	87
W. K. Chambers	With	drawn.					

HILLS DISTRICT, 1934.

[Judged by R. Hill, R.D.A., District Agricultural Instructor.]

Judging this year was made very difficult by the entries and particulars being submitted so late in the season, and in future judging should be made possible two months earlier. The late rains caused extraordinary growth in pastures which made the economical handling of pastures very difficult, and many of them were left to be cut for hay. In fact, some of the entries were actually being cut when inspected. Growth was so rapid late in the season that unless the pastures were in very small fields it was impossible with the livestock available to keep them grazed down as they should be to obtain maximum results.

There is need for more attention to subdivision in a district such as this competition embraces and many of the fields could be considerably reduced in area, which would make more economical grazing possible and subsequently allow the carrying of more livestock on more even and nutritious pastures. With the exception of Strawberry Clover in selected patches, the base of the best pastures has undoubtedly been Subterranean Clover and Perennial Rye Grass, and on the types of soil generally being made use of for pastures in the Hills district there seems to be nothing better.

Phalaris tuberosa was found in small quantities in some pastures, and much more of it could be used because of its ability to provide earlier feed than any other perennial pasture plant under these conditions.

One difficulty experienced with pastures is to control the inferior annual grasses that so readily appear once clover has been well established. The practice of clipping the high growth of these plants and preventing their seeding has proved to be effective and is strongly recommended. The cutting of fields occasionally for silage will also help materially in keeping such grasses under control.

That pastures have been improved considerably during the last few years is certain, but the handling of pastures after they have been established has not improved at the same pace, which means that there is too much wastage, and the quantity of livestock carried is below what it should be. Finance and not the lack of knowledge is usually the reply when this error of management is discussed with those concerned, but is it economical to continue when it can be overcome by storing reserves in the form of Silage and Meadow Hay and by subdividing the pastures into smaller fields to allow some form of rotational grazing to be carried out?

Liberal annual applications of superphosphate are essential to maintain high production in pastures, and those who felt that they could break away from that practice have, after the experience of one or two seasons, quickly realised their mistake.

The results of the judging are given in the following table:—

Competitor's Name and Address.	Position.	Density of Sward. 30	Quality of Pasture. 25	Freedom from Useless Weeds. 20	General Management. 15	Area Submitted. 10	Total. 100
H. A. Woolley, Mt. Barker J. .	1	28	22	20	13	5	88
Dunleith Past. Co., Ashbourne.	2	28	23	17	14	2	84
Cliff. Oakley, Kangarilla	3	25	20	17	11	10	83
A. Loud, Clarendon	4	26	21	17	13	2½	79½
G. Cleggett, Mt. Barker Springs	5	26	21	16	13	3¼	79¼
T. B. Brooks, Clarendon	6	24	20	17	12	5¾	78¾
E. H. Coote, Pt. Elliot	6	24	21	16	12	5¾	78¾
G. Cleggett, Mt Barker Springs	8	24	20	17	14	2½	77½
J. C. Blakeley, Scott's Bottom	9	24	20	18	12	1¼	75¼
Dunleith Past. Co., Ashbourne.	10	23	19	17	13	3	75
F. C. Keen, Victor Harbour ..	11	25	21	15	10	3¾	74¾
A. Harvey, Echunga	12	24	19	15	12	2½	72½

PASTURE COMPETITION—IRRIGATED AREAS.

[Judged by R. HILL, R.D.A. (District Agricultural Instructor.]

Unfortunately the shortage of feed during winter and early spring forced settlers to graze the pastures far too severely, but they had made quite good recovery. Although judged late in the year the majority of the pastures inspected were in really good heart.

There is much to be learnt in the handling of permanent pastures under irrigation, and it was very evident that subdivision, frequent light waterings, good drainage, the selection of the correct types of plants, and liberal applications of superphosphate are to be important factors in producing maximum results from that type of fodder.

Any permanent pasture required for milk production needs the presence of a leguminous plant and White Clover adapts itself so well to the reclaimed swamp areas that no other need be sought for this purpose, but the grasses are a much more difficult problem.

Perennial Rye Grass had not given the results expected of it in any cases under a system which applications of water are too far between. Cocksfoot has only persisted well on the higher or better drained points, but where it had managed to remain, splendid feed was produced. Prairie Grass, which is a very palatable grass, makes rapid growth and produces earlier autumn feed than the other grasses; does not persist under grazing like Perennial Rye Grass but, as mentioned in Mr. Wise's No. 2 entry, it had reseeded well where the pasture has been cut for hay.

It appears that Prairie Grass should be taken very much more into consideration as a mixture in pastures and steps taken to experiment with the hope of establishing a satisfactory method of retaining it in pastures. Paspalum had produced high yields of feed during the warm months, but should only be considered as a pasture to grow on the low-lying areas in conjunction with clover and in small fields which can be kept well under control. It was rather disappointing that where there is such a large area of permanent pastures under irrigation more entries were not presented for judging.

Name and Address.	Position.	Density of Sward. 30	Quality of Pasture. 25	Freedom from Weeds. 20	General Management. 15	Area submitted. 10	Total. 100
E. S. Wise, Jervois (1) ..	1	27	24	19	13	3	87½
W. T. Gale, Jervois (1) .	2	28	24	19	14	1½	86½
E. S. Wise, Jervois (2) ..	3	26	22	18	13	6	85½
E. S. Wise, Jervois (3) ..	4	27	23	18	13½	•2	83½
W. T. Gale, Jervois (2) .	5	27	23	18	13	1½	82½
A. E. Rothe, Jervois . ..	6	25	22	19	13	2	81½
A. O. Forster, Jervois ..	7	25	22	18	13	2½	80½
A. E. Rothe, Jervois . ..	8	24	21	19	13	1	78

TESTS TO DETERMINE THE EFFECT OF DIGGING OR DEEP PLOUGHING CLOSE TO FRUIT TREES WHILE IN FULL BLOOM.

[By R. Fowler, Manager Government Experimental Orchard, Blackwood.]

The question whether deep ploughing or digging operations close in to fruit trees while in full bloom would result in a diminished crop owing to root injury by implements used at this time was raised by Mr. H. N. Wicks in a paper on "Some Observations on the Cultivating of a Non-irrigated Orchard," read at a Conference of Fruitgrowers at Tanunda on 1st November, 1932. It was then decided to ask through the Advisory Board of Agriculture that experiments to determine this matter should be carried out at the Blackwood Orchard.

These tests were started in 1933-34 on peach and apple trees in the Barrier Rows in the Manure Test. The ground was ploughed in the ordinary way on 4th September, 1933. Using a single-furrow plough, the ground was worked right up to the stem of the trees to a depth of 3in. for the first three furrows, and then down to 5in. for the remainder of the land. During summer the soil was further worked with the spring-tine cultivator and harrows.

When the Elberta Peaches were in full bloom on the 21st September, each alternate tree in the three Barrier Rows was deeply and roughly dug with a four-pronged digging fork, the ground being stirred to the full depth of the fork, approximately 8in., in many instances bringing to the surface the underlying clay subsoil.

Many small fibrous roots were broken and numerous others exposed in the surface soil, where they were allowed to remain and dry out. The area dug extended out to the distance covered by the full spread of the branches, thus covering that portion of the soil adjacent to the tree, where many of the small fibrous roots are usually located.

Observations made during the growing period, which was an unusually dry one—only 316 points of rain being recorded for the five months—did not seem to indicate any loss of vigour in the trees roughly treated, nor was the quality of the fruit in any way impaired. There was no apparent difference regarding the length of annual growth or colour of foliage as between treated and untreated trees.

The crop was harvested between the 6th and 12th of February and carefully weighed. The results were as follows:—

Row.	No. of Trees in Row.	Mean Average per Tree in lbs. from Treated Trees.	Mean Average in lbs. from Untreated Trees.
1	12	101·29	78·96
2	12	92·79	90·00
3	12	72·21	68·71

In all 18 trees were treated and 18 left untreated, the average return per tree being respectively 88.76lbs. for trees cultivated during blossoming and 79.22lbs. for trees not cultivated during bloom, the difference being 9.53lbs. The observed differences are palpably insignificant and do not suggest any immediate adverse effect as a result of deep digging during bloom.

In the tests with Apples, 12 trees each of Dunn's Seedling, Jonathan, and Cleopatra were used. The routine treatment was the same as with the Peaches, the work being done in the same manner and at the same time.

In each plot six alternate trees were treated and six left untreated while the variety was in full bloom. The Cleopatras received attention on 14th October, 1933, the Dunn's Favourite on 18th October, and the Jonathans on 23rd October. With the Apples, as with the Peaches, the rough deep digging fractured many small roots and brought others to the surface, mostly in the clay subsoil. At the time of digging the soil was hard and compact as the result of heavy winter rains and two or three weeks of hot, dry weather just before the work was done. This soil condition resulted probably in greater injury to the small rootlets than would have been the case had the soil been in better physical condition. Observations did not reveal any outstanding differences in the trees during the growing period. The number of annual shoots and their length appeared to be much the same under each treatment.

The Apple trees are all the same age and are fairly even in size and development. All blossomed heavily and set good crops which were harvested before the end of April, with the following results:—

Variety.	No. of Trees in Tests.	Mean Average Crop per Tree from Six Treated Trees.	Mean Average Crop per Tree from Six Untreated Trees.	Decrease.	Increase.
		Lbs.	Lbs.		
Dunn's Seedling	12	346 83	302·42	-	44·41
Jonathan	12	185·87	168·83	—	17·04
Cleopatra	12	301·83	252·87	—	48·96

The average return per tree from the whole of the treated and untreated trees respectively being 278.17lbs. and 241.37lbs., a difference of 36.80lbs.

After allowing for crop variations due to outside factors, there would appear to be no significant difference revealed by the figures, so that apparently no serious injury resulted from the treatment. The experiment is being repeated.

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co. reported on 1st January, 1935:—

BUTTER.—Trading throughout December was satisfactorily maintained and the fact of the weather being fairly cool was responsible for a greater consumption than would otherwise have been the case. Production is falling back rapidly, but there is still a surplus of first and second grades going forward to London each week, but all the choicest now being manufactured in this State is required for home consumption. The London market showed some improvement during the Christmas week and at date of report the range was 72s. to 74s. per cwt. for choicest Kangaroo. Local rates at present are:—Choicest creamery fresh butter in bulk, 1s. 3¼d. per lb.; prints and delivery extra. (These prices are subject to stabilisation levies). Store and collectors' lots, 5d. to 5½d. per lb. according to quality.

CHEESE.—The South-Eastern factories kept markets well supplied and turnover was maintained. There was a better inquiry towards the end of the month for matured cheese and rates continued steady throughout at:—Large and medium, from 8d. per lb.; loaf, from 8½d. per lb. at store door, delivery extra; semi-matured and matured, 8½d. to 9d. per lb.

EGGS.—Supplies kept up well, although the quality, as is usual at the end of the season, depreciated. With export packing finished there are greater supplies available for local market, but at present interstate market is dull, so that heavy quantities are being manufactured into egg pulp. Rates are:—Ordinary country eggs, fair average quality, 5d. per dozen net; long distance rail or shipping eggs, lower; selected new laid clean eggs, 1¾ozs. and over, up to 7d. per dozen net.

BACON.—Trade in hams for the Christmas season was better than for a number of seasons past, but in anticipation of this curers marketed sufficient supplies to meet all requirements. Bacon sales were also satisfactory. Rates are steady at:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 8½d. to 9d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 3d. to 1s. 4d. per lb.

ALMONDS.—The sales of almonds in shell and also kernels were very satisfactory up to within about a week of Christmas, when there was a lull in demand. However, it is expected that trading will revive again this week and that all consignments will be cleared. Rates are:—Softshells and brandis, 9½d. to 10d. per lb.; hardshells, 5½d. to 6d. per lb.; kernels, 1s. 11½d. to 2s. 0½d. per lb.

HONEY.—Sales of this commodity continued very dull, and unless new markets can be obtained in some of the Continental countries the outlook is not at all promising, as there are very heavy stocks carried over and prices are only nominal at:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades, 1½d. to 2d. per lb.

BEESWAX.—Sold readily from week to week and values are steady at 1s. 4d. to 1s. 4½d. per lb., according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday, and our salerooms are the best equipped in the State. As is usual at the Christmas markets, very heavy quantities of live poultry were submitted, but, unfortunately, a large proportion of the birds to hand were poor and medium in condition and rates obtained for such were disappointing. For prime quality heavyweight table poultry, however, good prices were realised. It is expected that markets will be short throughout January and clients would be well advised to forward any surplus stock. Crates loaned free on application. The following are prices realised:—Prime roosters, 4s. to 5s. each; nice conditioned cockerels, 3s. 3d. to 3s. 11d.; fair conditioned cockerels, 2s. 3d. to 3s. 2d.; chickens, lower; heavyweight hens, 2s. 3d. to 3s. 2d.; medium hens, 1s. 7d. to 2s. 1d.; light hens, 1s. 3d. to 1s. 6d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 5s. to 6s.; young Muscovy ducks, 3s. 3d. to 4s.; ordinary ducks, 1s. 3d. to 2s. 6d.; ducklings, lower; geese, 4s. to 5s. 3d.; goslings, 3s. to 3s. 6d.; turkeys, good to prime condition, 11d. to 1s. 2d. per lb. live weight; turkeys, fair condition, 8d. to 10d. per lb. live weight; turkeys, poor and crooked breasted, lower; pigeons, 4d. to 6d. each.

POTATOES.—New seasons, 13s. per cwt.

ONIONS.—New season's, 9s. 6d. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING NOVEMBER AND DECEMBER, 1934.

IMPORTS.

Interstate.

	Nov.	Dec.
Apples (bushels)	82	670
Apricots (bushels)	—	142
Bananas (bushels)	17,948	12,253
Citrus—		
Grape fruit (bushels)	108	87
Lemons (bushels)	—	34
Oranges (bushels)	1,161	1,707
Mangoes (bushel)	—	1
Passion (bushels)	86½	82½
Paw Paws (bushels)	3	2
Pineapples (bushels)	487½	196
Strawberries (bushels)	—	11
*Tomatoes (bushels)	—	10
Nuts—		
Peanuts (bags)	243	45
Peanut kernels (bags)	67	26
Popple (bags)	3	1
Cucumbers (bushels)	182½	—
Garlic (package)	1	—
Onions (bags)	28	13
Potatoes (bags)	3,860	2,402

	Nov.	Dec.
Bulbs (packages)	43	32
Plants, Ornamental (packages)	59	35
Roots, Grass (package)	1	—
Seeds (packages)	72	87
Wine casks (No.)	2,859	3,001
Fumigated—		
Citrus—		
Grape fruit (bushels)	4	60
Lemons (bushels)	—	30
Oranges (bushels)	350	966
Wine casks (No.)	78	28
Rejected—		
Bananas (bushels)	24	33
Citrus, oranges (bushels) *	—	11
Passion (bushels)	½	1
Tomatoes (bushels)	—	10
Cucumbers (bushel)	½	—
Plants (packages)	1	1
Second-hand cases (No.)	40	2

* Prohibited Import.

Overseas.

State Law.

	Nov.	Dec.
Wine casks (No.)	1,175	1,676
Fumigated—Wine Casks (No.)	353	168

Federal Quarantine Act.

	November.		December.	
	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	5,423	829,641	10,388	819,802
		No.		
Plants	1	12	—	—
Canes	143	—	103	—
Chests, Cocoanut	195	—	442	—
Chest, tea	2,201	—	3,073	—
		Sup. ft.		Sup. ft.
Timber	220,166	5,750,925	143,663	1,466,889

EXPORTS.

Federal Commerce Act.

		Nov. Pkgs.	Dec. Pkgs.
Netherlands, East Indies	Cherries	—	3
	Gooseberries	3	3
New Zealand	Citrus—		
	Oranges	3,992	—
	Seeds	16	—

		Nov. Pkgs.	Dec. Pkgs.
Singapore	Cherries	—	2
	Citrus—		
	Lemons	2	3
	Gooseberries	4	—
	Plums	—	4
	*Vegetables	44	45
Straits Settlements	Cherries	—	3
	Gooseberries	3	3
	*Vegetables	3	3

* Potatoes excluded.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of December, 1934, for the year 1934, also the average precipitation for December, and the average annual rainfall.

Station.	For Dec. 1934.	Av'ge. for Dec.	Total Rain for 1934.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	—	0·47	2·66	4·66
Marree	—	0·75	3·29	5·88
Farina	—	0·59	3·29	6·43
Copley	0·10	0·77	6·77	7·87
Beltana	0·37	0·81	7·72	8·48
Blinman	0·12	0·91	8·57	11·86
Hookina	0·44	1·11	9·20	11·25
Hawker	0·33	0·88	10·36	12·26
Wilson	0·50	0·92	10·89	11·79
Gordon	0·48	0·90	7·94	10·53
Quorn	1·34	0·78	9·74	13·22
Port Augusta	0·20	0·60	6·66	9·44
Bruce	0·39	0·86	7·15	9·87
Hammond	0·27	0·87	6·62	11·21
Wilmington	1·03	0·89	14·56	17·32
Willowie	0·23	0·88	11·24	12·25
Melrose	0·96	1·03	20·45	22·88
Booleroo Centre	0·38	0·98	14·93	15·21
Port Germein	0·60	0·82	12·56	12·53
Wirrabara	0·54	1·02	16·73	19·29
Appila	0·56	0·99	15·32	14·65
Cradock	0·21	0·91	8·83	10·82
Carrieton	0·31	1·00	10·39	12·23
Johnburg	0·26	0·95	9·60	10·58
Eurelia	0·21	0·90	10·84	12·79
Orroroo	0·40	0·85	13·68	13·20
Nackara	—	0·92	10·66	11·09
Black Rock	0·27	0·86	10·89	12·37
Oodlawirra	0·07	1·32	11·44	11·68
Peterborough	0·15	1·03	13·43	13·22
Yongala	0·45	1·07	13·96	14·44
North-East.				
Yunta	0·04	0·74	5·22	8·55
Waukaringa	—	0·69	5·57	7·94
Mannahill	—	0·74	6·16	8·20
Cockburn	—	0·66	5·64	7·96
Broken Hill, N.S.W.	—	0·82	6·82	9·56
Lower North.				
Port Pirie	0·40	0·78	11·80	13·21
Port Broughton	0·48	0·67	12·49	13·88
Bute	0·33	0·72	14·09	15·44
Laura	0·70	0·90	19·04	17·95
Caltowie	0·77	0·97	18·03	16·74
Jamestown	0·89	1·08	19·45	17·69
Gladstone	0·70	0·88	17·95	16·29
Crystal Brook	0·52	0·89	14·52	15·78
Georgetown	0·73	0·97	13·40	18·37
Narridy	0·97	0·87	12·88	15·82
Redhill	0·45	0·86	13·83	16·59
Spalding	1·05	1·18	14·40	18·88
Gulnare	0·69	1·04	15·68	18·68
Yacka	0·75	0·91	14·65	15·39
Koolunga	0·80	0·94	12·37	15·38
Snowtown	0·66	0·77	13·30	15·74
Lower North—*continued.*				
Brinkworth	0·63	0·93	12·89	15·82
Blyth	1·12	0·93	13·79	16·78
Clare	1·18	1·14	19·70	24·51
Mintaro	0·77	1·18	20·75	23·42
Watervale	1·63	1·28	23·58	26·80
Auburn	0·85	1·08	22·83	23·98
Hoyleton	0·61	0·88	14·58	17·33
Balaklava	0·91	0·82	13·98	15·46
Port Wakefield	0·43	0·63	11·97	12·94
Terowie	0·23	1·06	13·20	13·35
Yarcowie	0·58	0·88	12·83	13·59
Hallett	0·47	1·01	13·84	16·46
Mount Bryan	0·35	1·05	14·61	16·83
Kooringa	0·47	0·97	14·25	17·85
Farrell's Flat	0·59	1·00	14·61	18·61
West of Murray Range.				
Manoora	0·56	1·10	19·91	18·92
Saddleworth	0·63	1·01	19·10	19·60
Marrabel	0·87	1·00	19·91	19·96
Riverton	0·90	0·95	20·11	20·81
Tarlee	0·60	0·95	17·38	18·10
Stockport	0·77	0·94	18·58	16·93
Hamley Bridge	0·45	0·94	15·12	16·54
Kapunda	0·64	1·02	17·61	19·79
Freeling	0·33	0·94	15·66	17·83
Greenock	0·54	1·09	18·30	21·53
Truro	0·24	0·93	14·55	19·89
Stockwell	0·28	1·03	15·59	20·13
Nuriootpa	0·41	1·10	18·78	20·72
Angaston	0·40	1·09	16·83	22·42
Tanunda	0·42	1·00	17·16	22·02
Lyndoch	0·55	1·04	17·22	23·40
Williamstown	0·58	1·09	19·36	27·77
Adelaide Plains.				
Owen	0·56	0·71	14·52	14·66
Mallala	0·48	0·86	13·12	16·56
Roseworthy	0·35	0·86	18·14	17·40
Gawler	0·28	0·89	14·78	18·91
Two Wells	0·60	0·84	16·57	15·75
Virginia	0·70	0·92	18·27	17·18
Smithfield	0·59	0·89	18·06	17·64
Salisbury	0·37	0·87	18·18	18·56
Adelaide	1·18	1·00	20·24	21·15
Glen Osmond	1·49	1·18	22·79	26·05
Magill	1·30	1·23	18·78	25·53
Mount Lofty Ranges.				
Teatree Gully	1·34	1·27	22·65	27·20
Stirling West	2·07	1·86	40·23	47·08
Uraidla	2·30	1·76	33·69	44·19
Clarendon	1·79	1·39	26·78	32·88
Morphett Vale	0·83	0·97	19·48	22·66
Noarlunga	0·97	0·77	17·71	20·37
Willunga	0·79	0·92	22·31	26·02
Aldinga	0·64	0·81	17·80	20·27

RAINFALL—*continued.*

Station.	For Dec. 1934.	Av'ge. for Dec.	Total Rain for 1934.	Av'ge. Annual Rain-fall.
Mount Lofty Ranges—*continued.*				
Myponga	1·19	1·07	27·78	29·50
Normanville	0·50	0·79	17·54	20·68
Yankalilla	0·63	0·86	20·72	22·83
Mount Pleasant	0·94	1·06	20·15	27·23
Birdwood	1·04	1·20	22·74	29·21
Gumeracha	1·28	1·36	27·06	33·41
Millbrook Res.	1·62	1·60	30·80	34·68
Tweedvale	1·60	1·36	32·18	35·99
Woodside	1·13	1·27	23·92	32·31
Ambleside	1·50	1·37	27·88	34·90
Nairne	1·29	1·15	23·24	28·22
Mount Barker	1·33	1·26	25·85	31·31
Echunga	1·49	1·29	30·44	33·30
Macclesfield	1·32	1·22	26·20	30·43
Meadows	1·35	1·39	29·44	36·16
Strathalbyn	1·15	0·86	19·49	19·31
Murray Flats and Valley				
Meningie	0·91	0·81	14·49	18·37
Milang	0·42	0·70	14·17	14·91
Langhorne's Ck.	0·55	0·79	16·59	14·87
Wellington	0·44	0·80	14·55	14·65
Tailem Bend	0·61	0·95	15·12	15·06
Murray Bridge	0·47	0·79	11·44	13·56
Callington	0·94	0·81	13·30	15·19
Mannum	0·47	0·62	10·67	11·49
Palmer	0·40	0·84	14·17	15·63
Sedan	0·12	0·64	8·70	12·11
Swan Reach	0·16	0·73	10·95	10·64
Blanchetown	—	0·73	11·03	11·01
Eudunda	0·45	0·95	16·15	17·17
Sutherlands	0·28	0·72	9·80	10·84
Morgan	—	0·78	8·31	9·17
Waikerie	—	0·77	9·99	9·65
Overland Corner	—	0·78	6·71	10·32
Loxton	0·23	0·83	10·54	11·54
Berri	0·08	0·90	9·35	10·17
Renmark	—	0·80	8·77	10·41
West of Spencer's Gulf				
Eucla	0·04	0·51	13·39	9·96
Nullarbor	—	0·42	10·69	8·81
Fowler's Bay	—	0·31	10·40	11·94
Penong	0·04	0·47	10·57	12·27
Koonibba	0·01	0·53	11·08	12·13
Denial Bay	—	0·38	9·68	11·36
Ceduna	—	0·43	11·43	10·16
Smoky Bay	—	0·46	8·44	10·53
Wirrulla	—	0·45	10·18	10·54
Streaky Bay	—	0·42	12·89	14·88
Chandada	—	—	9·98	—
Minnipa	0·01	0·63	10·96	14·06
Kyancutta	0·02	—	10·32	—
Talia	—	0·57	10·32	14·76
Port Elliston	0·03	0·50	14·86	16·54
Yeelanna	0·03	0·55	15·93	15·94
Cummins	0·10	0·62	17·36	17·60
Port Lincoln	0·31	0·68	15·94	19·42
Tumby	0·14	0·76	17·70	14·12
Ungarra	0·15	0·77	18·10	16·85
Port Neil	0·05	0·78	13·52	13·09
West of Spencer's Gulf—*continued.*				
Arno Bay	0·18	0·64	14·31	12·65
Rudall	0·01	0·54	12·87	12·64
Cleve	0·30	0·68	17·40	14·83
Cowell	0·38	0·53	11·28	11·07
Miltalie	0·27	0·61	15·22	13·67
Darke's Peak	—	0·79	13·06	15·18
Kimba	0·02	0·53	9·74	11·82
Yorke Peninsula.				
Wallaroo	0·46	0·59	13·32	13·98
Kadina	0·47	0·66	13·24	15·64
Moonta	0·19	0·67	15·13	15·06
Paskeville	0·14	0·68	14·74	15·49
Maitland	0·40	0·77	16·93	19·90
Ardrossan	0·34	0·57	13·06	13·97
Port Victoria	0·02	0·69	13·59	15·44
Curramulka	0·26	0·73	15·16	17·87
Minlaton	0·25	0·63	14·83	17·79
Port Vincent	0·26	0·68	12·98	14·43
Brentwood	0·13	0·62	14·89	15·55
Stansbury	0·40	0·60	16·33	16·82
Warooka	0·07	0·55	14·64	17·49
Yorketown	0·21	0·60	13·92	16·88
Edithburgh	0·21	0·62	16·17	16·37
South and South-East.				
Cape Borda	0·30	0·78	23·45	24·82
Kingscote	0·50	0·73	20·68	19·14
Penneshaw	0·99	0·82	20·83	18·92
Victor Harbour	0·74	0·85	22·75	21·37
Port Elliot	0·68	0·82	21·15	19·93
Goolwa	0·67	0·77	18·95	17·85
Copeville	0·29	0·85	11·97	11·51
Meribah	0·32	0·81	10·52	11·31
Alawoona	0·26	0·74	10·54	10·36
Mindarie	0·40	0·84	12·67	12·21
Sandalwood	0·42	0·93	13·26	13·66
Karoonda	0·27	0·99	10·90	14·36
Pinnaroo	0·34	0·85	12·48	14·43
Parilla	0·38	0·79	11·57	13·82
Lameroo	0·54	0·93	12·59	15·97
Parrakie	0·50	0·87	12·98	14·62
Geranium	0·58	1·00	12·56	16·51
Peake	0·41	0·94	13·93	16·01
Cooke's Plains	0·54	0·83	14·48	15·30
Coomandook	0·41	0·80	15·35	17·09
Coonalpyn	1·04	0·90	17·72	17·61
Tintinara	0·87	1·04	17·23	18·71
Keith	1·03	0·97	18·33	17·92
Bordertown	0·40	1·03	15·78	19·21
Wolseley	0·54	0·95	17·56	18·49
Frances	0·52	1·19	18·58	20·11
Naracoorte	0·50	1·14	20·78	22·66
Penola	0·37	1·32	22·51	26·01
Lucindale	0·46	1·14	25·78	23·34
Kingston	0·53	1·11	21·62	24·28
Robe	0·81	1·02	22·85	24·67
Beachport	0·52	1·13	25·34	27·09
Millicent	0·91	1·29	31·78	29·79
Kalangadoo	0·74	1·46	30·85	32·28
Mount Gambier	0·71	1·62	24·85	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings. Jan.	Dates of Meetings. Feb.
Adelaide	*	—	—
Alawoona	*	—	—
Allandale East	†	18	15
Alma	*	—	—
Appila-Yarrowie	*	R	1
Arthurton	*	—	—
Aahbourne	*	16	13
Auburn Women's	812	25	22
	*		
Balaklava	*	R	24
Balhannah	*	—	—
Balhannah Women's	*	—	—
Balumbah	*	—	—
Balumbah Women's	*	R	R
Beetaloo Valley	†	14	18
Belalie Women's	810	R	R
Berri	*	15	12
Belvidere	*	—	—
Blackheath	†	24	21
Black Rock	*	—	—
Black Springs	†	R	—
Blackwood	*	14	11
Blyth	*	25	22
Booborowie	*	14	18
Booleroo Centre	*	18	15
Boolgun	*	—	—
Boor's Plains	*	R	7
Boor's Plains Women's	*	—	—
Borrika	*	—	—
Bowhill	*	14	18
Brentwood	*	8	7
Brinkley	*	16	13
Brinkworth	*	14	18
Brownlow	*	—	—
Buchanan	795	—	—
Bute	*	R	21
Butler	*	—	—
	*		
Caliph	*	—	5
Caralue	*	16	13
Carrow	*	16	13
Ceduna	*	—	—
Chandada	*	—	—
Charra	*	19	16
Cherry Gardens	796	—	—
Chilpuddie Rock	*	—	—
Clare Women's	†	5	2
Clarendon	*	14	18
Cleve	*	5	2
Collie	*	2	6
Coomandook	*	R	22
Coonawarra	*	31	26
Coonawarra Women's	*	16	20
Cummins	*	11	8
Cungena	*	3	7
Currency Creek	*	21	18
	*		
Dudley	*	—	—
	*		
Echunga	*	9	13
Elbow Hill	*	17	14
Eudunda	*	7	4
Eurelia	*	12	9
Eurelia Women's	*	R	R
	*		
Farrell's Flat	*	25	22
Finniss	*	—	—
Frances	*	—	—
Frayville	796	—	—
	*		
Gawler River	*	—	—
Georgetown	*	19	16
Geranium	*	26	23
Gladstone	†	18	15

Branch.	Report on Page.	Dates of Meetings. Jan.	Dates of Meetings. Feb.
Gladstone Women's	†	22	19
Glencoe	*	8	12
Goode	†	—	—
Goode Women's	*	—	—
Greenock	†	21	18
Green Patch	*	17	14
Gumeracha	*	21	18
Hanson	*	15	12
Hartley	†	16	13
Hindmarsh Island	*	—	—
Hope Forest	*	7	4
Hope Forest Women's	*	—	—
Hoyleton	*	21	18
Inman Valley	*	R	21
Jamestown	*	16	20
Jervois	*	10	14
Kalangadoo Women's	*	12	9
Kalangadoo	*	12	9
Kalyan	*	16	20
Kangarilla Women's	*	R	21
Kanni	*	—	—
Kapinnie	*	—	—
Kapunda	*	11	8
Karoonda	*	23	20
Keith	*	17	14
Kelly	*	R	2
Ki Ki	*	—	—
Kilkerran	*	17	14
Kongorong	*	14	18
Koolunga	*	—	—
Koonibba	*	17	14
Koonunga	794	—	—
Koppio	*	23	20
Kringin	*	21	18
Kulkawirra	*	R	R
Kyancutta	*	—	5
Kybybolite	*	15	12
Kybybolite Women's	†	R	—
Lameroo	†	19	16
Langhorne's Creek	*	16	13
Laura	*	R	22
Laura Bay	†	—	—
Laura Bay Women's	†	8	12
Lenswood and Forest Range	*	—	—
Light's Pass	†	—	—
Lipson	*	R	16
Lone Gum and Monash	*	17	21
Lone Pine	*	14	18
Lowbank	*	16	13
Loxton	*	11	8
Lyndoch	†	15	12
McLaren Flat	*	—	—
McLaren Flat Women's	†	R	7
Macclesfield	†	17	21
MacGillivray	*	15	12
Mallala	*	21	18
Maltee	*	17	14
Mangalo	*	—	—
Mangalo Women's	*	9	13
Marama	*	R	R
Meadows	*	16	13
Milang	*	19	16
Millicent	*	R	22
Millicent Women's	*	R	R
Miltalie	*	9	16
Monarto South	†	—	—

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. Jan.	Feb.
Monarto South Women's	*	19	16
Moorlands	*	23	—
Morchard	*	R	22
Morchard Women's	*	R	27
Mount Barker	*	21	18
Mount Bryan	*	—	—
Mount Compass	*	—	—
Mount Gambier	*	11	8
Mount Hope	*	R	R
Mount Pleasant	*	11	8
Mudamuckla	†	12	9
Mundalla	*	—	—
Mundalla Women's	*	17	21
Murray Bridge	*	R	—
Murraytown	*	—	—
Mypolonga	*	—	—
Myponga	*	24	21
Myrla	*	16	13
Nantawarra	*	17	14
Naracoorte	*	12	9
Narridy	*	—	—
Narrung	*	—	—
Nelshaby	*	—	—
Nelshaby Women's	*	—	—
Netherton	*	16	13
Nunjikompita	*	17	14
Nunkeri	*	17	14
O'Loughlin	*	14	11
O'Loughlin Women's	*	—	—
Overland Corner	*	16	13
Owen	*	14	11
Palabie	*	—	—
Parilla	*	15	19
Parilla Women's	†	16	20
Parilla Well	*	21	18
Parilla Well Women's	*	29	26
Parrakie	*	—	—
Parrakie Women's	†	29	26
Paruna	†	4	1
Paskeville	*	15	12
Pata	*	4	1
Penola	*	5	2
Penola Women's	814	—	—
Penwortham	*	16	13
Petersville	*	15	12
Petina	*	26	23
Pinbong	*	—	—
Pinnaroo	*	—	—
Pinnaroo Women's	*	R	15
Port Elliot	*	—	—
Pygery	*	15	12
Pygery Women's	*	—	—
Quorn	*	—	—
Ramco	*	14	18
Redhill	*	—	—
Rendelsham	†	19	16
Rendelsham Women's	†	—	—
Renmark	*	—	—
Riverton	*	14	11
Roberts and Verran	†	R	--
Rosedale	†	—	—
Roseworthy	*	—	—
Rudall	*	15	12
Saddleworth	*	18	15
Saddleworth Women's	*	—	5
Scott's Bottom	*	19	16
Sheoak Log Women's	814	—	—
Shoal Bay	*	15	12
Smoky Bay	*	—	—
Snowtown	*	11	8
Snowtown Women's	*	R	R
South Kilkerran	*	15	12
Springton	*	2	6
Stanley Flat	*	21	18
Stockport	*	R	—
Strathalbyn	*	9	13
Streaky Bay	*	25	22
Sutherlands	*	—	—
Talia	*	25	22
Tantanoola	†	5	2
Tantanoola Women's	*	2	6
Taplan	*	R	R
Taplan Women's	815	—	—
Taragoro	*	17	14
Tarlee	*	—	—
Tatiara	*	—	—
Tintinara	*	—	—
Truro	*	21	18
Tulkineara	*	17	14
Tweedvale	†	17	21
Ungarra	*	24	21
Upper Wakefield	*	—	—
Uraidla and Summerton	*	7	4
Waddikee Rocks	*	19	16
Waikerie	*	11	8
Wallala	*	R	R
Wanbi	*	23	27
Wandearah	*	15	12
Warcowie	*	15	12
Warcowie Women's	†	—	—
Warramboo	*	R	12
Warramboo Women's	*	R	R
Wasleys	*	10	14
Wasleys Women's	*	3	7
Watervale	*	21	18
Waurultee	*	15	12
Weavers	*	R	11
Wepowie	*	14	18
Wepowie Women's	*	—	—
Wilkawatt Women's	†	—	...
Williamstown Women's	*	2	6
Willowie	*	28	25
Wilmington	*	R	12
Wilmington Women's	815	—	—
Wirrabara	*	—	—
Wirrabara Women's	†	—	—
Wirrilla	*	R	14
Wirrilla Women's	*	10	14
Wirrulla	*	16	20
Wolseley	*	14	11
Wudinna	*	—	—
Yadnarie	*	15	12
Yandiah	*	R	8
Yaninee	*	—	—
Yeelanna	*	16	13
Yundi	†	16	20
Yurgo	*	—	—
Yurgo Women's	*	—	—

* No reports received during the month of December. † Held over.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying.	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilizers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

With the aid of a microphone connected with an amplifier on a motor car, officers had no difficulty in making their addresses heard at the Kybybolite Experiment Farm Field Day on November 9th.

Other Reports Received.

Branch.	Date of Meeting	Attendance.	Subject.	Secretary.
Wolseley	9/7/34	9	Address—A. L. Warren .	E. Sharrad
Wolseley	14/8/34	14	Address—L. J. Cook	E. Sharrad
Allandale East .	23/11/34	10	Congress Reports	J. Laslett
Tantanoola	1/12/34	14	Congress Reports	L. Osborne
Rendelsham ...	28/11/34	10	Address—A. Edquist	F. Todd
Mount Gambier.	14/12/34	12	"Hints to Young Farmers," W. Burrows	G. Gurry
Allandale East .	21/12/34	7	"Stock Diseases," A. McMillan	J. Laslett

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

KOONUNGA.

November 1st.—Attendance, 14.

HOW TO OBTAIN GOOD WELL OR BORE WATER.—Mr. A. H. Falkenberg read the following paper:—"This is a matter of great importance to the man on the land. It is one of the first questions to consider whenever a person acquires a property. A place without a good supply of water is always a worry to the man who is managing it. If searching for water, get into touch with someone who is good with a divining rod. With this it is possible to locate any underground veins, although it is never safe to say that they are all water-bearing or whether it is good or bad. Well sinking is a job which requires great care on the part of the men doing it. Only a good and sound rope or wire rope is good enough for the purpose. If a chain is used next to the bucket, this should be strong and have no split links, which are a great danger to the man in the well; they are likely to go sideways and break. Nor should a hook be used on the bucket; this should be fastened tight. As the work progresses and wet soil is noticed, a supply of bricks should be there in readiness for setting the walls of the well. I prefer to do it with bricks right to the top even if it is fairly rocky. Boring for water can be done by a simple method or with engine and plant. The simple method is to procure a handy bore for the soft soil, a rock drill in case rocks are encountered, and a slush pump to suck out the drilled rocks. The bore is screwed to pipes of the same size, adding more pipes as the hole gets deeper and a pair of strong tongs are used for turning the pipes and bore. When the bore is full it must be removed and emptied. In case the rock drill is used, this is worked in a jumping action, turning at the same time. Water is poured down in the pipe. It is for this that the slush pump is used to suck out the drilled rock. Boring for deep water should be let to an experienced man. Dry wells, or wells containing too salty water, should either be filled with soil or fenced off and covered. This applies not only to wells, but also to any other pit or tank. If a good underground supply is not available, then a dam in a higher position than the homestead will be useful, but it is likely to go dry in a late summer. A good water supply is a wonderful aid to success." (Secretary, H. Mibus.)

December 19th.—Attendance, 14.

THE DAIRYING INDUSTRY.—Paper read by Mr. F. Collins:—"The dairying industry is worth about £40,000,000 per year to Australia, and will be worth considerably more in the very near future. There are several well known breeds of dairy cattle, and it depends on the ability of the man in charge of which particular breed he fancies. It is important that a dairyman devote his ability and time to the breed that he thinks is most fitted to his own conditions, but if he is to be successful he must be sure that his heart is in the interests of that particular breed. Most successful dairymen now know that they must test regularly, 'cull the cows that you have to keep, and breed from the cows that keep you,' using a pure-bred bull from a proved producing cow. Pasture improvement involving the sowing of suitable grasses and clovers, regular use of fertilisers, and harrowing, are also necessary. The modern dairy cow has come to be regarded as a machine. However, it requires much more consideration than most machines. It must be managed with sound judgment and a great deal of commonsense. Its health must be safeguarded and good water is essential. A cowshed with its east side open is most suitable. In making a choice of dairy cattle, there are several breeds to pick from, the Shorthorn, Red Poll, Friesian, and Guernsey are somewhat large cattle, requiring heavier feeding than the lighter Ayrshire and Jersey breeds. On lighter grazing and in hilly country the smaller breeds will prove the better stock to handle. At present the dairying industry is going through a hard time—it is even harder for the inefficient dairyman, who still uses the 'scrub' bull: it clearly shows that the 'scrub bull' is one of the dairyman's enemies, as every pure breed society has substantially increased its membership since the drop in butter prices. It is not within the power of the average dairymen to raise the price of butterfat, but it is in every dairyman's power to get better returns from every cow. A good, pure-bred cow whcih is a heavy producer is not so costly to keep as the cow from the 'scrub bull'." (Secretary, H. Mibus.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mount Bryan ..	17/11/34	5	Congress Report	A. Jefferies
Gladstone	24/11/34	8	Homestead Meeting	M. Hoare
Gladstone	26/11/34	14	Congress Report	M. Hoare
Beetaloo Valley	22/11/34	13	Address—A. G. Strickland, M.Sc.	B. Giddings

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BUCHANAN.

November 29th.—Attendance, 11.

PIG RAISING.—The following paper was read by Mr. R. Roebuck:—"Pig raising combines with most phases of agriculture, and in these times of depression is a valuable sideline. The pig is able to convert into profit many products that would otherwise be wasted. The pig is a clean animal if housed in clean quarters. Of late years the most popular pig has been the progeny of the Tamworth boar crossed with the Berkshire sow, and for the export trade in particular, the Large White or the Large White crossed with the Mid-York sow. Export buyers prefer the white breeds because of the better colour and conformation of the dressed carcass. *Breeding*: To make pig raising fully profitable, it is essential to breed the right type of pig. The average breeder of pigs cannot, at a moment's notice, dispose of his mongrel sows and replace them with better animals, but he can adopt a policy of gradually improving his stock, and the first step in this direction is to obtain a boar of the selected breed and mate him with the sows. To improve the sows, the breeder should select from his flock those pigs which nearest approach his ideal and breed from them, and if this practice is followed with each litter, much will have been done to improve the standard of the pigs. If at any time it is desired to start cross-breeding, then a pure-bred boar should be introduced." (Secretary, L. V. Bell.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Light's Pass ...	19/11/34	30	Address—W. C. Johnston	C. Verrall
Rosedale	24/9/34	13	Question Box	S. Simcock
Rosedale	1/11/34	29	Social	S. Simcock
Black Springs ..	20/11/34	8	Congress Report	K. Dunn
Light's Pass ...	17/11/34	20	Address—J. Craig	C. Verrall
Lyndoch	20/11/34	14	Address—J. B. Harris ...	J. Hammatt
Lyndoch	18/12/34	9	Discussion	J. Hammatt

WESTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Lipson	17/11/34	8	Discussion	M. Barraud
Taragoro	18/10/34	6	Congress Report	T. Winter
Taragoro	15/11/34	—	Visit to Roberts and Verran	T. Winter
Balumbah......	21/11/34	14	Congress Reports	A. Jericho
Chandada	22/11/34	20	Congress Reports	H. Chewings
Goode	21/11/34	—	Congress Reports	B. Linke
Mudamuckla ...	5/12/34	7	Congress Reports	A. Maguire

EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Lameroo	23/11/34	10	Address—A. J. A. Koch .	A. Potter
Paruna	19/11/34	15	Paper from *Journal*	F. Sumner

SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

December 15th, 1934.

The December meeting was held at the residence of Messrs. A. R. Stone and Sons, there being present 13 members and 15 visitors, including representatives from the Blackwood Branch. The afternoon was spent looking over the orchard. In the evening items of interest that had come under notice during the afternoon inspection were discussed.

It is with regret that the Branch reports the death of Mr. Caleb Lewis, a life member of the Agricultural Bureau, a foundation member of the Cherry Gardens Branch, and one who, until comparatively recently, had taken an active part in the work of the Bureau since he first became a member in 1892. He will long be remembered by local members as a man who gave of his best to the Bureau. His advice could always be relied upon, and regretting his death, members look back on the influence for good his life had on the tillers of the soil of the Cherry Gardens district.

FRAYVILLE.

November 20th.—Attendance, 10.

The Crop Competition results were announced by the judge, Mr. R. Hill (District Agricultural Instructor). The scale of handicap points under which the Competition is run proved a success. It gives competitors in the lower rainfall areas a chance to get within striking distance of the higher rainfall area. Mr. J. O. Bottroff, of Palmer, gained the highest number of points (81), but G. W. Faehrmann, with a handicap of 10 points, eliminated him from first position with 89 points. The order of merit with handicap points are as follows:—1, G. W. Faehrmann, 89; 2, J. O. Bottroff, 84; 3, S. Watchel, 80¾; 4, N. Watchel, 80½; 5, A. F. Watchel, 79½; 5, H. A. Helbig, 79½; 5, H. B. Scheer, 79½; 8, T. O. Peamm, 76½; 9, S. A. Bretag, 74½; 10, L. Watchel, 74; 11, C. M. Hein, 66. Mr. M. Shearer, who was present on behalf of Shearers Limited (the donors of the prize money) then presented the successful competitors with the trophies, at the same time congratulating them on their success.

Crops recommended for seed were:—N. Watchel, Nabawa; T. H. Watchel, Nabawa; J. O. Bottroff, Sword and Nabawa; W. Faehrmann, Nabawa. (Secretary, H. Ramm.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Hope Forest ...	5/11/34	21	Annual Meeting	E. Muldoon
Hartley	21/11/34	10	Question Box	W. Brook
Cherry Gardens	17/11/34	150	Annual Social	A. Stone
Monarto South .	17/11/34	21	"Haymaking," T. Peake.	C. Altmann
Tweedvale	18/10/34	30	Addresses—L. Pfeiffer and B. Schapel	B. Schapel
Tweedvale	22/11/34	—	Address—A. R. Hilton...	B. Schapel
Blackheath	22/11/34	10	Question Box	E. Paech
Yundi	26/11/34	—	Addresses—C. Verco and H. Peters	T. Smart
Macclesfield	13/11/34	11	Address—Mr. Nitschke ..	H. Ross

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

GOOD THINGS FROM THE OVEN.

[By Grace B. Armstrong, A. Marie Schrieber, and Mary A. McPhee, of the University of Illinois, Urbana, U.S.A.]

(*Continued from page* 428.)

FROSTINGS AND FILLINGS.

The simplest frosting is made by sprinkling sugar over the unbaked cake, While baking, the sugar forms a glaze which serves as a finish.

Frostings which are used to spread over the surface of the cake and as fillings are made of sugar and a liquid. They may be either cooked or uncooked. A frosting should be neither hard enough to crack and crumble nor soft enough to be sticky. It should be well flavoured but not too highly flavoured.

It is a bit difficult to acquire the technique of securing a smooth surface over the whole area of a cake, but skill can be acquired with practice and care. The less the frosting is touched with a knife or spatula, the smoother the surface will be.

UNCOOKED FROSTINGS.

Uncooked frostings may be made of whipped cream, jelly, jam, or confectioner's sugar and a liquid. A confectioner's sugar rather than cane sugar must be used for this purpose, since the frosting must have a smooth, well-blended consistency. Ordinary cane sugar would dissolve so readily that a syrup would be formed. The filler in confectioner's sugar tends to prevent the formation of a syrup.

Confectioner's Frosting.

Equipment.

1 measuring cup	1 tablespoon
1 mixing bowl	1 teaspoon
1 rolling pin	1 spatula or knife
1 sifter	

Materials.

2 Tb. boiling water, cream, or fruit juice	¼ t. flavouring extract
	¾ c. confectioner's sugar

Amount: Enough to cover 1 loaf cake 3in. x 3½in. x 8½in.

Method.

Roll and sift sugar to remove lumps. Gradually add sugar to liquid until mixture is of the right consistency to spread. After each addition of sugar, the mixture should be well stirred. Add flavouring. Spread on cake by using spatula or knife dipped in hot water.

Whipped Cream and Fruit Filling.

Equipment.

1 bowl	1 sharp knife
1 Dover egg beater	

Materials.

2 Tb. sugar	¾ pt. whipping cream
3 oranges or 3 bananas or 1 small can pineapple	½ c. walnuts, pecans, or hickory nuts

Amount: Enough for a 3-layer cake 9in. in diameter.

Method.

How.	*Why.*
Chill bowl, beater, and cream.	Cream that is not chilled may form butter before it can be made stiff.
Beat cream with Dover egg beater. When stiff and of smooth appearance, add sugar.	Cream should not be beaten beyond smooth, stiff stage. If beaten longer it becomes granular; this is condition of the cream just before butter forms.

Spread whipped cream on a layer of cake. Lay slices of fruit on top of cream and sprinkle on some nuts. On top layer put only whipped cream or add some decorations of citron or whole nut meats. This filling makes a very rich cake which should be eaten the same day it is prepared and should be kept in the ice box or other cold place until used. The cream will sour if the cake is not used within a few hours.

COOKED FROSTINGS.

Sugar and a liquid are the ingredients used in cooked frostings. During the process of cooking, the sugar solution is condensed. By beating the cooled product, air is incorporated and any large groups of crystals that may have formed are broken up.

Boiled Frosting.

Equipment.

1 saucepan	1 measuring cup
1 tablespoon	1 Dover egg beater
1 teaspoon	1 large bowl

Materials.

1 c. sugar
½ c. water
1/16 t. cream of tartar

1 egg white
1 t. vanilla or ½ t. lemon juice

Amount: Enough to frost 2 loaf cakes 3in. x 3½in. x 8½in

Method.

How.	*Why.*
Put sugar, cream of tartar, and water in saucepan over heat.	Cream of tartar is an acid. When cane sugar is boiled with an acid a smoother consistency results.
Stir mixture until sugar has dissolved.	Stirring prevents sugar from sticking to saucepan. It also aids in dissolving sugar crystals.
Cover pan for first 3 minutes the solution is boiling.	Steam collects on sides of pan and prevents formation of large crystals, which would fall back into the syrup and make the frosting granular.
Remove cover from saucepan.	Evaporation must take place before the syrup can condense.
Do not stir syrup after it begins boiling.	Stirring beyond this point tends to make frosting granular .because it washes back into the syrup any crystals that may have formed on the sides.
Allow syrup to boil until it forms a thread of "hairs" when dropped from tines of fork. If a thermometer is used, the reading at this stage will be 238°F. On a rainy day the mixture should be cooked longer, or to 244°F.	In rainy weather, moisture in the atmosphere prevents the syrup from hardening unless it is condensed sufficiently to allow for this. It is better to overcook the syrup than not to cook it long enough.
When cooked, remove syrup from fire. While syrup cools, beat egg white until stiff but not dry.	Beating of the egg is left until this time because egg white does not retain its lightness if it stands long after beating. However, the beating cannot be delayed too long, for syrup will require close attention at the very last. If syrup is not cooled slightly, the egg will coagulate too quickly and leave lumps.
Slowly pour syrup on beaten egg white; beat continuously with Dover egg beater while pouring. (If Dover beater is used, the person making the frosting will need assistance.)	A Dover egg beater gives the frosting a fine texture.
Continue beating until mixture is of such consistency that it will spread readily on the cake and yet remain in place. Add flavouring.	If beaten too short a time, the frosting will "run"; if too long a time it will not be smooth. A little experience will make it easy to determine the right consistency.

Put frosting on cake with as few motions as possible. Slowly pour it on centre of cake and allow it to run down sides. Smooth it around sides with a few well-directed strokes of the spatula. Allow frosting to become firm before cutting cake.

Milk Frosting.

Equipment.

1 measuring cup	1 mixing spoon
1 teaspoon	1 saucepan

Materials.

1½ c. sugar	1 t. butter
½ c. milk	½ t. vanilla

Amount: Enough to frost 1 loaf cake 3in. x 3½in. x 8½in.

Method.

Put milk and sugar in saucepan and stir until sugar is dissolved. Boil without stirring for 12 to 15 minutes, or until syrup will form a soft ball when dropped into cold water. Remove from fire. Add butter Allow to cool. (If butter is added at the last it does not lose any of its flavour. It also tends to form an oily film over the top of the syrup, which prevents many crystals from forming.)

Beat until the right consistency to spread. Add flavouring. When beating, do not scrape down any crystals or any syrup that collects on the sides of pan. Pour frosting over cake, spreading evenly with spatula or back of stirring spoon.

Chocolate Frosting.

Follow directions given for milk frosting, but as soon as the boiling point is reached add 1 or 1½ squares of grated chocolate. (If chocolate is added at first, it does not blend well, and is likely to cause the milk to curdle.)

Brown Sugar Frosting.

Equipment.

Same as for milk frosting.

Materials.

1½ c. brown sugar	⅓ to ½ c. cream
1 Tb. butter	

Amount: Enough to frost 1 loaf cake 3in. x 3½in. x 8½in.; use double the recipe for a three-layer cake 9in. in diameter.

Method.

Same as for milk frosting except that it is well to scald the milk before adding the brown sugar. (Brown sugar contains a small amount of acid. Scalding the milk before adding the brown sugar will tend to prevent the acid from curdling the milk.)

PASTRY.

PLAIN PASTRY.

Pastry is a combination of flour, fat, salt, and cold water. The proportion of fat to flour determines the richness of the product and to some extent the method of handling. In plain pastry the usual proportion is ¼ cup of fat to 1 cup of flour.

Equipment.

1 measuring cup	1 tablespoon
1 mixing bowl	1 flour sifter
1 teaspoon	1 rolling pin
1 fork	1 moulding board
2 knives	1 pie pan

Materials.

1½ c. flour	6 Tb. fat
1 t. salt	Cold water

Amount: 2 crusts.

Method.

How.	*Why.*
Have all ingredients cold.	A flakier pie crust results from cold ingredients because more air can be incorporated around stiff pieces of fat around soft ones, and also because the colder the air the greater its expansion during baking.
Sift flour and salt together.	This insures thorough distribution of salt.
Cut cold fat into flour, using two knives, or a fork.	Handling pastry with fingers warms the materials.
Use only enough water to hold ingredients together. Add slowly and toss mixture with a knife or fork. *Do not stir.*	Since any stirring or kneading develops gluten, great care must be exercised in handling pie crust, if it is to be tender and flaky.
Slightly flour board, using as little flour as possible. Toss pastry on to flour. Clean out bowl with a spatula. Using a quick motion, pat rough edges together, at same time forming dough into a circular shape.	The less flour incorporated in pastry, and the less pastry is handled, the more tender it will be.
If 2 crusts are to be made, cut dough into 2 pieces. The one for the lower crust should be slightly larger than the one for the upper.	This avoids having to roll the second crust twice.
Turn over piece of dough so that both sides are floured. Quickly shape it into a round flat surface. Roll with rolling pin from centre to outer edge, using a light, quick motion and pressing on a different part of the dough each time. Occasionally lift crust from board. (When using moulding board, be as neat and economical as possible. Practically no flour should be left on board when the product is finished.)	It may be necessary to lift dough from board or to turn it slightly to prevent it from sticking, but this should be done without stretching dough.
When large enough for the pie, fold crust in half, lift it up, place on pan, and unfold into place.	Crust is more easily handled in this way, and stretching of dough is prevented.
Press out all air bubbles from underneath the crust, beginning to press at centre of pan and working toward edge.	Air bubbles under crust make an uneven surface after baking, as a result of the expansion of air by heat. This is especially true of crust baked before filling is added.
Roll out upper crust and cut small holes in centre. Holes should be larger for a berry pie than for an apple pie.	Holes are to allow for escape of steam and to prevent pie from running over.
When a juicy fruit (berries) or a fruit which darkens easily (apples) is used it is better to make both crusts before filling is added.	If filling is added before upper crust is made, berry juice will soak into lower crust, making it soggy. Apples will become dark.
Fold upper crust in half.	

Method.

How.	*Why.*
With tips of fingers dipped in cold water moisten edges of lower crust. Place upper crust upon pie, unfold, and press edges of upper and lower crusts together. An attractive finish is made by using a fork. Cut around with a knife to make edges even.	The moistened surface causes the 2 crusts to stick together.
Place on lower grate and bake in hot oven (400°F.) about 40 minutes or until light brown.	Pie crusts should be well-baked to make them digestible, but should never be over-browned or burned.

PIE WITH PREVIOUSLY COOKED FILLING.

Method.

Prepare plain pastry, using ½ of the above recipe. Invert pie plate and cover outside with pastry. Press with finger tips, working from centre. Press crust well to plate, making sure that edge of pastry fits edge of plate. A very little air left under the pastry will expand and make a large bubble in baked crust. Trim edges to make them even. Prick crust in several places with a fork to allow steam and air to escape from under the crust. Place on baking sheet or large pan in oven, so that edge of crust will not come in contact with floor of oven. Bake for 15 minutes in hot oven (400°-425°F.) but be careful not to over-brown. Cool and fill with prepared filling.

Lemon Pie.

Equipment.

1 double boiler	1 mixing bowl
1 measuring cup	1 egg beater
1 tablespoon	1 grater
1 teaspoon	1 lemon squeezer

Materials.

¾ c. sugar	2 egg yolks
5 Tb. flour or 3 Tb. cornstarch	1 t. butter
¾ c. boiling water	3 Tb. lemon juice
	Grated rind 1 lemon

Amount: Filling for 1 pie crust.

Method.

How.	*Why.*
Mix cornstarch or flour, and sugar together.	Sugar separates the starch grains and prevents starch from lumping when added to water.
Place top of double boiler directly over heat and allow water to boil rapidly.	Much time will be saved by starting the cooking directly over the heat.
Slowly add the above mixture and continue to boil 3 minutes, stirring constantly.	Adding mixture slowly prevents lumping. Product burns easily and should not be allowed to remain directly over heat for more than 2 or 3 minutes.
Place the 2 parts of double boiler together. Cook for 20 minutes over boiling water. Add butter.	Thorough cooking is necessary to overcome the raw taste of starch.

Method.

How.	*Why.*
Remove from fire and cool slightly; beat egg yolks and add the mixture to them. (The egg whites will be used for the meringue.) Return to fire and heat only until eggs thicken slightly.	If eggs are added to mixture they will be cooked too hard and will form lumps.
Remove from fire. Add lemon juice and grated rind. Stir and beat well.	If acid were added at first, mixture would not thicken well.

Pour filling into prepared pie crust, cover with meringue, and place in slow oven (300°F.). Remove when meringue is a delicate brown.

MERINGUE.

Equipment.

1 platter or large bowl	1 tablespoon
1 egg whip	1 teaspoon

Materials.

2 egg whites	½ Tb. lemon juice or
2 Tb. powdered sugar	¼ t. vanilla

Amount: Enough to cover 1 pie.

Method.

Beat egg whites until stiff. Add sugar gradually and continue beating. Then add flavouring. Pile on the pie lightly, taking care to cover only the filling. The finished product should not look flat and uniform; it is more attractive if uneven. Brown in slow oven (300°F.).

PUMPKIN PIE.

Equipment.

1 mixing bowl	1 egg beater
1 measuring cup	1 stirring spoon
1 teaspoon	1 strainer

Materials.

1½ c. steamed and strained pumpkin	½ t. salt
⅔ c. brown sugar	2 eggs
1 t. cinnamon	1½ c. milk }
½ t. ginger	½ c. cream } or 2 c. milk

Amount: Enough for 1 large pie.

Carefully strain cooked pumpkin. Mix sugar and spices together and add to pumpkin Beat eggs until whites and yolks are thoroughly mixed but not frothy. Add other ingredients and stir until thoroughly blended. Taste the mixture, using a clean teaspoon. Make any necessary additions according to taste.

Prepare a crust of plain pastry, and line a pan with it. The crust may be made deeper by making a fluted edge. Instead of cutting off uneven edges, fold them back and under slightly; pinch dough together by using thumb and forefinger of each hand, pressing hands towards each other. Pour in pumpkin mixture.

Bake at once in hot oven (425°F.) for 20 minutes. Reduce temperature to 25°F. and bake about 30 to 40 minutes more.

BERRY PIE.

Prepare two crusts. Wash and carefuly drain the berries. When filling the pie with berries or any other juicy fruit, it is necessary to mix flour with the sugar before sweetening the pie. Use 1 tablespoon of flour or minute tapioca to ½ cup of sugar. The flour or tapioca thickens the juice and prevents it from soaking into the crust. The amount of sugar needed in a pie will depend upon the tartness of the fruit used.

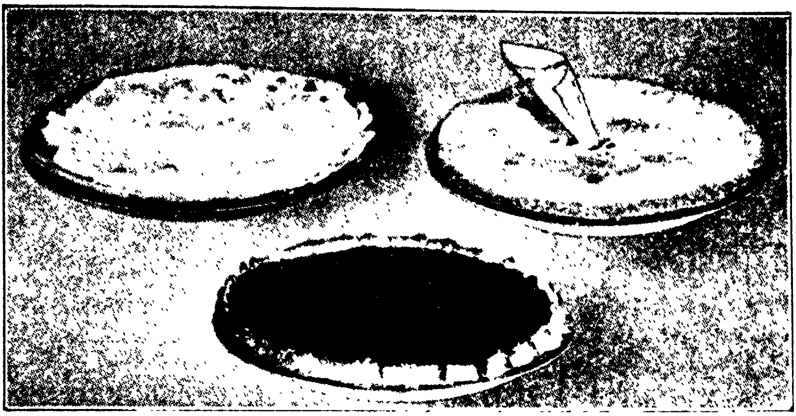


Fig. 18.—Lemon Meringue, Berry, and Pumpkin Pies.

Fig. 19.—Cinnamon Rolls and Yeast Bread.

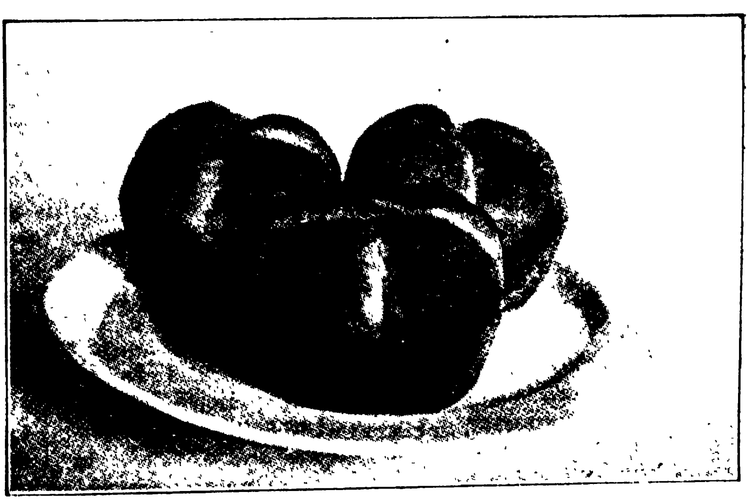


Fig. 20.—4H Clover Leaf Rolls.

Insert a paper funnel in one of the openings in the upper crust. The funnel acts as a chimney, allowing the steam to escape and preventing the pie from running over.

Bake in moderate oven (about 350°F.) until the crust is a light brown and the juice bubbles up in the opening of the top crust.

APPLE PIE.

Materials.

Pastry for 2 crusts	1 t. cinnamon or ½ t. nutmeg
2 or 3 sour apples, or enough to fill the pie	½ to 1 c. sugar

Amount: 1 pie.

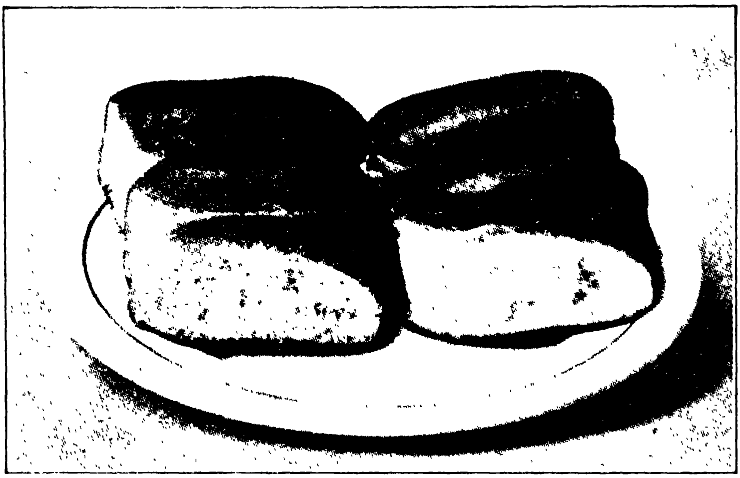


Fig. 21.—Parker House Rolls.

Method.

Prepare the crusts before paring the apples, for apples turn dark very quickly after paring. Pare apples and cut them in small pieces. Put them in the crust, filling it very full. (An apple pie can have more filling than a berry pie or one with much juice.) Mix the spice and sugar together, using ½ to 1 cup of sugar to 1 apple pie, the exact amount depending upon the tartness of the apples, and 1 teaspoon of cinnamon. Sprinkle the sugar and cinnamon evenly over the apples. Put on the upper crust, following general directions for plain pastry (see page 58).

Bake in hot oven (425°F.) for about 10 minutes; reduce temperature to 350°F. and bake until apples are soft. Test with a clean toothpick inserted through one of the holes in the upper crust.

RICH PASTRY.

A rich pastry can be made by using ⅓ cup of fat to 1 cup of flour. Butter makes a tougher but a flakier pastry than does lard and also gives a better flavour. Part butter and part lard is a good combination for a rich pastry. When substituting butter for lard in pastry, remember that butter is not 100 per cent. fat, and so more butter must be used than is stated in the recipe. In general, two tablespoons butter should be added for each cup of pure fat required. Care must be taken to keep the ingredients cold during the mixing process. The baking must be done carefully to prevent scorching the fat.

YEAST BREADS.

PROCESSES OF MAKING.

Bread may be made by either of two processes, depending upon the time allowed. They are commonly called the short process, or straight dough method, and the long process, or overnight sponge.

Short Process, or Straight Dough Method.—All the flour is added at the time of mixing. A stiff dough is kneaded, is permitted to double its size, is made into loaves, and is again permitted to double its size. Either compressed or liquid yeast is used in order to hasten the process, as this yeast is already in an active state. This process may be completed in 3 to 5 hours, depending on the amount of yeast used and the temperature at which it is kept.

Long Process, or Overnight Sponge.—Dried yeast is used for this process As the yeast plants in dried yeast are in less active form, they must be given more time to develop, and their food must be easily available. As the yeast plants do not grow so readily in a stiffer dough, a thinner sponge is made by adding only part of the flour. The sponge usually is allowed to stand overnight. Then the remainder of the flour is added and the rest of the process is the same as for the short method.

INGREDIENTS USED.

Flour, liquid, and yeast are essential ingredients in making yeast breads. Besides these, salt and sugar are usually used. Salt improves the flavour of bread, but if used in larger proportions than 1 teaspoonful to each loaf the action of the yeast is retarded. Sugar hastens the growth of the yeast, but too much sugar toughens both the crust and the crumb. Results show that 2 teaspoonfuls of sugar per loaf is the best amount to use.

KNEADING.

In kneading, use the lower part of the palm near the wrist; curve the fingers to keep the dough from flattening out too much. With every push, turn the dough one-quarter way round and fold over. When bread is kneaded enough, it is quite smooth and elastic, bubbles appear beneath the surface, and it is spongy to the touch. In making the loaf, shape the dough in the hands, working it very lightly and stretching the underside, which will form the top of the leaf. Shape into an oblong piece and place in baking pan. The main point to watch in shaping the loaf is the smoothness of the surface; the corners will fill out in rising.

POINTS IN BAKING YEAST BREADS.

Baking bread in single-loaf pans has been found more satisfactory than baking several loaves in one large pan. Standard size bread pans are 8½in. long, 3½in. wide, and 3in. deep; they hold a 1lb. loaf. This size allows the air to circulate evenly, and insures a well-shaped loaf. If the loaves touch each other, the heat cannot penetrate between the loaves readily, and the side exposed to the heat will rise more rapidly than the unexposed side, resulting in a misshapen loaf. If a large number of loaves are baked at the same time so that the oven is crowded, it is well to change the position of the pans occasionally so that all the loaves may bake evenly. Covering the loaves for the first 10 minutes of the baking period with a bread pan will insure a more uniform shape. The edges of the inverted pan should be greased to avoid sticking.

Loaves of bread made with the proportions given should bake for 45 minutes. The bread should begin to brown in 15 minutes, after which time the temperature should be reduced gradually. Bread should be baked in a hot oven (about 410°F.) for 1 hour. In the absence of a thermometer, one of the following tests may be made:—Place a piece of unglazed white paper of medium weight in the oven; if it becomes golden brown in 5 minutes the oven is about right for the bread. Or,

sprinkle ½ teaspoon of flour on a small tin in a layer ¼in. thick; if it becomes a golden brown in 5 minutes, the temperature is probably about right. These tests are not accurate, but may be of some assistance to the beginner.

Bread is done when it shrinks from the sides of the pan and has a hollow sound when tapped.

The amounts in the recipes given below should be increased in proportion to the number of loaves desired. An exception is yeast, 1 yeast cake being sufficient for 4 loaves of bread. The following proportions are used for 4 loaves:—

4 c. liquid	4 t. shortening
8 t. sugar	1 cake yeast
4 t. salt	3 to 4 qts. flour

SHORT PROCESS YEAST BREAD.

Equipment.

Moulding board	1 flour sifter
1 measuring cup	1 mixing spoon
1 teaspoon	1 mixing bowl
1 saucepan	1 bread pan

Materials.

1 c. liquid (skimmed milk, water and whole milk or water)	1 t. salt
	1 t. shortening
	½ cake compressed yeast
2 t. sugar	3 to 4 c. flour

Amount: 1 loaf.

Method.

How.	*Why.*
Scald milk or boil water.	This kills any bacteria present that might impair flavour or texture of bread.
Put sugar, salt, and shortening in mixing bowl and pour scalded liquid over them.	This is an easy way of melting shortening and dissolving sugar and salt.
Allow mixture to become lukewarm (80°F.).	A boiling temperature would kill yeast plants.
Soften yeast in a little of lukewarm liquid and add to rest of ingredients.	Blending yeast in liquid insures its being more evenly mixed.
Add flour gradually and beat until dough is stiff enough to be handled on a board.	It will probably take some practice to find the exact amount of flour needed. Since different kinds of flour absorb different amounts of liquid, no exact proportions can be stated.
Sift small amount of flour on to dry, clean board.	This prevents sticking, but too much flour will make bread heavy.
Turn dough on to board and knead until it is elastic and does not stick to board or hands. If dough sticks, clean board by scraping with a knife. Grease board slightly, then continue kneading.	At least 10 minutes will be required to knead dough so that all yeast plants may be scattered throughout mixture and all ingredients thoroughly mixed. Proper kneading is necessary if bread is to have a smooth texture with evenly distributed holes throughout. Kneading also makes the gluten more elastic.

Method.

How.	*Why.*
Keep dough soft.	Better bread can be made from too soft rather than from too stiff dough.
Place dough in greased bowl and oil top of dough to prevent formation of crust. Cover with clean towel. Leave in warm place until dough has doubled in bulk.	A temperature of 80°F. is favourable for growth of yeast plants.
Turn on to board, knead lightly, and shape into loaf. Place loaf in greased bread pan and set in warm moist place until it has again doubled in bulk. Moisture may be obtained by placing pan of boiling water near loaves.	A lighter loaf is made by giving yeast plants plenty of chance to develop. A gas (carbon dioxide) is freed as yeast develops. This gas, in trying to force its way to top, causes mixture to rise.
Bake in hot oven (410°F.) from 45 minutes to 1 hour. Remove from pan and place on rack to cool.	Placing loaf on a rack allows air to circulate freely on all sides so that bread will not become steamed.

LONG PROCESS YEAST BREAD.

Same as for short process.

Materials.

1 c. liquid	1 t. salt
¼ cake dry yeast	1 t. shortening
2 t. sugar	3 to 4 c. flour

Amount: 1 loaf.

Method.

How.	*Why.*
Soak yeast for about 20 minutes in ¼ cup warm liquid to which ¼ t. sugar has been added.	Dry yeast is not in an active state and the growth of cells must be started.
Scald rest of liquid and add to sugar, salt, and shortening, and cool until lukewarm. When lukewarm, add softened yeast.	This is an easy way to melt shortening and dissolve salt and sugar. Too great heat destroys yeast cells.
Add about half the flour, or enough to make a batter that can be beaten easily.	Yeast plants grow more readily in a thin than in a stiff dough.
Beat thoroughly for several minutes.	Beating incorporates air, which assists in growth of yeast cells.
Cover well and let stand overnight in warm place. (Temperature should not exceed 75°F.). In morning add rest of flour and knead well.	Standing overnight gives inactive yeast cells time for growth. From here on, method is the same as in short process.
Let rise to double in bulk. Shape into loaves and again allow to double in bulk. Bake in hot oven (410°F.) from 45 minutes to 1 hour. Remove from pan and place on rack to cool.	A lighter loaf is made by giving yeast plants plenty of chance to develop. A gas (carbon dioxide) is freed as yeast develops. This gas, in trying to force its way to top, causes mixture to rise.

VARIATIONS OF YEAST BREAD.

Entire Wheat or Graham Bread.—Equipment is same as for short process except for addition of tablespoon.

Materials.

1 c. liquid	1 t. salt
2 Tb. molasses	2 c. graham flour
¼ to ½ yeast cake	1 c. flour or more

Amount: 1 loaf.

Method.

Either the long or short process may be followed, the smaller amount of yeast being used for the long process and the larger amount for the short process. In the long process the white flour should be used to make the sponge. Graham bread should not be allowed any longer time to rise than white bread, for it will never rise as much as bread made of white flour.

Raisin, Currant, or Nut Bread.—One-half to ¾ cup of raisins, currants, or nuts may be added to the bread just bfeore the first kneading.

Raisin Biscuits.—Part or all the bread dough may be made into biscuits. Proceedceed the same up to time of shaping loaves; then add raisins. Cut or pull small pieces of uniform size from dough and shape in same way as for loaves. Place in baking pan and spread with melted butter. Allow to rise until 3 times the original size, and bake in hot oven (410°F.) 20 to 25 minutes depending on the size of biscuits.

Clover-Leaf Rolls or Biscuits.—Ingredients are used in the same amounts as for bread, except that the amounts of fat and sugar are doubled. Take small portions of dough and roll with hands into balls about ¾in. to 1in. in diameter. Place in well-greased muffin rings, using 3 or 4 pieces to each ring, to make either a 3- or 4-leaf clover. Brush rolls with melted butter and allow to rise until 3 times the original size, or very light. Bake in hot oven (410°F.) about 20 minutes.

Cinnamon Rolls.—Use same dough as for clover-leaf rolls. Roll a portion into an oblong piece about ¼in. to ⅜in. thick. Spread with melted butter and sprinkle with cinnamon and sugar that has been mixed together in the proportion of ½ teaspoon of cinnamon to 2 teaspoons of sugar. Currants or raisins may be added. Roll like a jelly roll and press edges firmly together. Cut in slices 3in. thick and place on greased pan. Let rise until 3 times original size. Bake in hot oven (410°F.) about 25 minutes.

Parker House Rolls.—Use same dough as for clover-leaf rolls. When ready to shape, roll dough about ½in. to ⅜in. thick on lightly floured board and cut with biscuit cutter. Dip handle of case knife in flour, and with it make a crease through middle of each piece. Brush half of each roll with melted butter, fold, and press edges together. Place rolls in greased pan, about 1in. apart. Cover with clean cloth and let rise again. Bake in hot oven (410°F.) about 15 minutes.

HOUSEHOLD HINT COMPETITION.

Conducted by the Belalie Women's Branch and judged by a committee from the Wepowie Women's Branch, who awarded first prize to Mrs. P. Frost, who submitted Hint No. 13. For second place the committee selected Hints Nos. 21 and 30, which were sent in by Mesdames Frost and Haskard:—

1. *Water* is the most useful thing in the house, as it is used for drinking, cooking, cleaning, washing, bathing, watering the garden, and hundreds of other purposes.

2. *To use stale bread and left-over crusts*: Bake crusts in oven until brown and crisp. When cold, put through mincer and store in tin ready for use. These can be used for fish, cutlets, patties, or chops, &c.

3. Place a sheet of paper under the blanket when ironing and the blanket will never slip.

4. *Nutmeg Hint*: Put nutmeg through the mincer, then into pepper shaker to sprinkle over puddings, &c. Saves time and the nutmeg is sprinkled evenly in this way.
5. Sulphur mixed with castor oil is excellent for healing sores, particularly those of chickenpox.
6. A perished hot water bag cut at one side, filled lightly with crumpled newspapers, and sewn up again can be used to kneel on when scrubbing floors.
7. *A beauty hint*: Keep a piece of pumicestone on the bathrack and when taking a hot bath, after soaking it for a few minutes, rub the soles of the feet carefully with the pumicestone, and especially any place where hard skin or corns are at all inclined to form. This remedy will prevent many foot troubles. If the feet and ankles become tired or swollen in warm weather, they will be much benefited by being rubbed at night with pure methylated spirit.
8. When hands are stained through peeling fruit or vegetables, rub them with a mixture of vinegar and salt. It will very quickly remove all stains.
9. The juice of a lemon added to the water in which a lettuce is soaked makes it beautifully crisp.
10. To save in washing up, always grease the bottom of the saucepan before placing on the fire. A piece of flannel attached to a stick and kept in a tin with melted fat is an easy way.
11. Thin raw starch applied to windows, allowed to dry, and wiped off with a soft cloth is an excellent cleanser and polisher.
12. Cloudy ammonia sprinkled on a wad of newspaper and rubbed on window-panes will keep flies off them.
13. *To help croup*: Soak a flannel in 1 dessertspoon each vinegar and methylated spirits, 2 dessertspoons water, and wrap round the throat.
14. 1 teaspoon of cream of tartar in 1lb. of dripping will make the dripping equal to butter for cooking.
15. *To clean aluminium saucepans*: Boil rhubarb for 10 minutes in saucepan and it will clean like new.
16. When arranging flowers in an open bowl or vase, first put in a piece of small-mesh wire netting and the flowers will stay in place much easier than without the wire.
17. When cleaning windows polish with newspaper and it will give a brilliant shine.
18. To get double the quantity of juice from a lemon warm in the oven before squeezing.
19. Orange peel dried in the oven makes excellent kindling.
20. After addressing the label of a bag or trunk and when the ink is quite dry, rub a warm candle all over the label. This will make it rainproof and stop the ink from running.
21 and 30. *To make a lettuce crisp*: Put it in a bowl of water with an ordinary steel knife.
22 and 40. When sealing jam, preserves, &c., with paper, mix Epsom salts with flour paste. This will prevent rats, mice, or cockroaches from interfering with the contents.
23. *A hint for busy times*: Before shearing or harvest begins, when lunches are required for many extra men, make up a large quantity of self-raising flour, have plenty of cleaned currants and sultanas on hand, also a supply of good clarified dripping.
24. A strong and attractive beach or tennis purse can be made from coloured deck chaircanvas. The material can be bought at a reasonable price and will wear for years.
25. A piedish or basin which is difficult to get cleaned, if damped and turned upside down for a few minutes will wash clean quite easily without any scraping.
26. *Floor stain*: To brighten up boards which have previously been stained, ½lb. shellac, ¼lb. resin (rolled), 1½ bottles methylated spirits. Leave for 24 hours and shake occasionally.
27. To remove ink stains from linen, rub with raw tomato juice. If one application is not effective, try again.
28. When making fruit salad, soak the oranges first in boiling water, letting stand for five minutes. The white, pithy part will come off quite easily with the skin, and the orange is left clean for slicing.
29. *Pure grape vinegar*: Procure a large open-mouth earthenware vessel and fill with well-bruised grapes, stems included. Cover with muslin and let stand until all fermentation is completed. This will take perhaps six months. Strain and bottle. This makes very strong vinegar, and good for home use, pickles, &c. Doradilla grapes make good light vinegar and dark grapes the dark vinegar.
31. *To lengthen the life of lustre wear*: Draw lengths of material or pyjama cords through garment before putting on line—pegs always make runs in same.
32. Nothing makes corned beef more tender than a piece of washing soda no bigger than a pea. Put the meat on in cold water and bring to the boil, then drop in the soda and some sugar, and simmer.
33. After singeing a fowl and before opening, wash in warm water with a cloth, using a little common soap; it cleanses the skin and makes it more wholesome for eating.

34. Put all ingredients for making soap into a kerosene tin and stand in water over a brisk fire. This only needs stirring occasionally, which saves time. Time for boiling, 3 hours.

35. *Leaking jug*: A coat of bath enamel inside of a leaking water jug will cure the leak, and if there is a hole, it may first be filled with white sealing wax. This will stand boiling water and last for years.

36. Lemon rinds boiled with tea towels keeps them a good colour.

37. Keep the coffee essence bottle wrapped in a paper bag. This will catch the drops and obviate sticky shelf and fingers.

38. When a tank shows signs of a leakage, clean the part and brush over with paint. Then stick on a new piece of calico. Paint again and stick on another piece of calico. Then brush some more paint over.

39. Empty cotton reels nailed to the kitchen wall make useful pegs on which to hang damp towels and dischcloths, as they do not rust or tear the cloth as easily as nails. They can be enamelled as desired.

41. When jam is boiling, if a teaspoonful of butter is added it will prevent scum from settling on the top, therefore saving the jam.

42. To prevent bananas going black when cut sprinkle with lemon juice.

43. To make a dustless duster, soak in kerosene and dry until rubbed on a white board makes no mark.

44. To repolish furniture, a little olive oil and vinegar rubbed on furniture, and then rub briskly with a dry cloth.

45. When boiling green peas put two or three of the pods in the water to preserve colour of the peas.

46. To remove spots from a woollen skirt, wear the skirt in the house for a few days inside-out. The friction will do the rest.

47. Newspaper screwed up and damped makes splendid fuel for the bath-heater.

48. Boracic acid added to water when washing handkerchiefs whitens them.

49. Add a pinch of sugar to water in rose bowl. This lengthens the life of roses and prevents drooping.

50. Add a pinch of baking powder to mashed potatoes to make light and fluffy.

51. Warm the basin when boiling water before beating eggs for a sponge. Eggs are much lighter and beat more quickly than in the ordinary way.

52. Failing a "mendit," use a patent fastener when the aluminium saucepan leaks.

53. To keep vegetables fresh for several days, keep in an airtight tin.

(Secretary, Mrs. E. Orchard.)

AUBURN (Average annual rainfall, 24in.).

November 30th.—Attedance, 21.

HOME SWEET MAKING.—The following paper was contributed by Mrs. Burfield:—"An aluminium or enamel saucepan to hold more than the amount of the ingredients is the first essential. Any kind of stove can be used although a kerosene one or a primus, the heat of which can be controlled evenly, is preferred. If a wood fire is used it is advisable to have the fire going some little time before ready to start. Be sure that the sugar has thoroughly dissolved before the mixture starts to boil and always boil rapidly. After the mixture boils, put on the lid of the saucepan for two minutes, remove the lid, and wash down the sides of the saucepan with a brush that has been dipped in warm water. Never allow the brush to touch the syrup. To 1lb. of sugar add ¾ cup of water. If more water is added it takes the toffee longer to reach the desired temperature. There are 3 stages in sweet making: 240°, 'caramel stage,' or if the mixture is dropped in cold water it can be rolled in the fingers without adhering to the fingers; 310°, 'toffee stage,' which when dropped in water should snap like glass; 230° is for cocoanut ice and other sweets that have to be beaten. Glucose is often used in the making of sweets, but cream of tartar or tartaric acid can be used as a substitute in many recipes. Never stir toffee after the sugar has boiled, but caramels need stirring all the time." *Toffee Recipe*: 1lb. sugar, ¾ cup water, a little glucose or cream of tartar. Boil to 310°. Add a little butter as the toffee is being taken off the fire, and then pour on to almonds on a buttered dish. *Caramels*: 1 large cup of sugar, 1 level tablespoon flour, stir well together then add piece of butter size of egg, 2 tablespoons golden syrup, ½ cup milk. Boil quickly for ½ hour, stirring all the time. Test by dropping a little into cold water. If there is a soft ball, pour out and leave to set. Before quite cold, cut and shape. Wrap in paper to keep. *Turkish Delight* (Mrs. Jones): 2ozs. gelatine, 2lbs. sugar, ¾ pint boiling water, 1 teaspoon citric acid, essence of lemon, colouring. Soak gelatine in cold water until limp, put into a saucepan with sugar, boil 5 minutes then add citric acid and boil 1 or 2 minutes. Add essence and colouring, pour on to wetted dishes and leave until set. Cut into cubes and roll in icing sugar. (Secretary, Miss L. Dennison.)

PENOLA.

December 5th.—Attendance, 25.

EGGS.—Paper read by Miss L. McKay:—"When we partake of some particularly luscious sweet meat, cake, or other table delicacy, how often do we give a thought to one ingredient without which our bill of fare would be very poor indeed. Can we imagine a kitchen without a supply of eggs in its store? They seem as much an essential as flour or sugar.

Looking back upon the days of the early Britons, you may remember that historians have given us to believe that the table dainties of those far distant days consisted of loaves of sodden dough, but it is not easy to trace first when or where eggs entered upon the list of table luxuries.

Probably some cook (undoubtedly a woman) dabbling in some original ideas in a cave kitchen, produced a remarkable result when experimenting with eggs, a result that was to create most astounding changes in the culinary art, and thus hand down through the ages of what we really owe to this humble agent, as being the principal factor in most branches of modern cookery, and for many other purposes as well. To contemplate a table spread with wonderful examples of the culinary art, must surely cause any of us to realise what a debt we owe to our egg-producing birds. Hens, of course, are the principal egg producers, and quite often ducks supply the necessity and, in some rural districts, swan eggs have been used.

The eggs of the aquatic birds, as a rule are heavier in colour and flavour than those of the ordinary hen, and whilst some people prefer them for eating, yet they are not considered favourably for the baking of light cakes. Turkey eggs may be regarded as something unusual, being somewhat rare, and they have a very pleasing flavour. What may be regarded as a luxury and was at one period regarded as being portion of the royal feasts of the kings of old, are the eggs of the pea-hen. Too heavily flavoured, and extremely rich, one cannot imagine them as being daily fare, but it is easy to imagine them being favoured by the early day royalties, who were noted for their passion for highly seasoned and richly flavoured foods, and their gluttonous feastings.

Eggs vary in size, shape, and colour, and rather strangely the heavier the breed of the hen, the smaller the egg. Light breeds, such as the White and Brown Leghorns, and the Minorcas, produce very attractive eggs, large and white, whilst the eggs of the heavier fowls are usually smaller and of brown shades. Apart from their value as an ingredient in cake and pudding mixtures, eggs are of very special value in so many other branches of housekeeping.

'Necessity is the mother of invention,' so runs the old adage, and in no case is it more truly spoken than of the egg, as it so often has to play a very prominent part in the affairs of life, when more valued articles are unobtainable.

In cases of non-corrosive metallic poisons, such as arsenic, copper, lead or zinc, quantities of egg and milk administered after an emetic are soothing and stimulating. Eggs are of great importance in invalid dishes, and for young children they are invaluable, the yolk containing vitamins which are essential to the growing child. These are but a few of the many uses we may put eggs to, and most people have had, no doubt, occasion to utilise eggs in other directions.

A competition for the best ½doz. eggs was judged by Mrs. Thos. Oswald and Mrs. F. J. Kidman. Points awarded were:—(1) Mrs. A. H. Reschke, 3 points; (2) Mrs. A. J. Ricketts, 2 points; (3) Mrs. R. Lynn, 1 point. (Secretary, Mrs. Edith Kidman.)

SHEOAK LOG.

December 6th.—Attendance, 27.

GARDENING HINTS.—The following points are taken from an address given by Mr. P. Gwynne, of Gawler:—The preparation of soil was most important. Here a gardener could learn a lot from the farmer if he worked his garden the same way as a farmer worked his fallow. One common mistake in gardening was the use of too much manure, especially in the growing of Antirrhiniums and Stocks. Poppies, Sweet Peas, and Dahlias required carefully prepared soil. For seed raising, the soil should not be too rich and well pressed down in boxes. All seeds should only be planted their own depth. Sieved soil and fine manure should be used to cover them. Large seeds such as Zinnias were best sown straight into the flower beds then there was no setback by transplanting. Every gardener was faced with disease. Mealy bug was one of the most common pests found in the fernhouse. Painting everything with methylated spirits would destroy this pest eventually. Slugs and snails were found in every garden in cool weather. Lime sprinkled over the ground was a help, but the best plan was to pick them up." (Secretary, Miss K. Koch.)

TAPLAN.

November 21st.—Attendance, 22.

CULTIVATION OF RHUBARB.—Mrs. Schwerdt read the following paper:—"Rhubarb is a profitable and palatable crop, worthy of a place in every garden. It has decided medicinal properties of no mean consideration; it is easily grown, and with a little attention will last upwards of 20 years. Being a perennial, any extra attention to soil preparation is adequately repaid. Rhubarb requires, for best results, a fairly deeply worked, rich, light, sandy loam, and it should be perfectly drained. Heavy soils are improved by addition of sand, humus, &c., for rhubarb is usually not very profitable on heavy land. The plant is a very gross feeder, so, whilst preparing the soil, work in heavy supplies of manure, and break the soil to a fine tilth. It is better to plant roots, rather than wait for seeds to grow. Plant the roots from early May to late August, in rows 4ft. apart, and leave 4ft. between the plants in the rows. Do not cover the crowns with more than about 2in. of soil. Keep the ground regularly cultivated to destroy weeds and conserve moisture. It will be necessary to continue this treatment regularly until the roots cover the ground. Old established plants should be given a liberal dressing of old manure every autumn to maintain their vitality and ensure a heavy crop for the following season. Some of the best varieties are 'Copp's Winter,' 'Early Albert,' and 'Wilson's Ruby,' also 'Cherry' rhubarb."

INTERESTING AND APPETISING LUNCHES (Mrs. Galley):—"In preparing sandwiches for lunches, bear in mind the fact that they usually are not eaten immediately, and therefore a centre that aids in retaining moisture is always of benefit. In this regard also much may be done by suitable packing of the sandwiches when cut, and in this respect too much emphasis cannot be given to the value of vine leaves whenever procurable as a wrapping. Vine leaves, washed and shaken to take off surplus moisture, combined with the use of grease-proof lunch wraps, will keep a lunch for many hours in the same condition as when it was first packed. The first suggestion is the use of seeded raisins or sultanas with thinly cut brown bread. This is a very simple recipe, but a delightful change from the everlasting meat sandwich. The use of brown bread in itself makes an interesting change in sandwich preparation, and another centre which is particularly suitable for use with it is marmite with chopped pickled shallots or onions. Thin slices of Kraft cheese with slices of onion always make an appetising centre for either brown or white bread, while for use with white bread, finely cut lettuce with egg is a pleasant change from the usual plain egg sandwich. Curried egg is also a good change for those who like curry. Brain and walnut is an extremely tasty and appetising filling for sandwiches. Apart from the sandwich portion of a lunch, there are certain kinds of cakes which definitely pack better than others; and again, raisins can be used in the preparation of raisin loaf, which is very appetising and wonderful for remaining moist over a long period. Nut bread is simply made and a great standby, which is enjoyed by everybody. The firmer types of cakes are most suitable for lunch preparations; sponges and such like cakes have a tendency to crush."

YEAST AND YEAST CAKE (Mrs. Scheadel).—*Yeast*: Boil 1 fair-sized potato with a little hops the size of a 2s. piece with 1½ pints of water for half an hour, strain and cool. Add 1½ cups of sugar and a little stale yeast. Ready to use in the morning. *Yeast Cake*: 4lbs. plain flour, 1½lbs. sugar, 12ozs. butter or lard. Melt the butter, 6 eggs, beat essence of lemon, vanilla, and cinnamon into them. Grate a little nutmeg into the flour, 4 cups sweet milk, about 3 pints of yeast; knead in the morning. It takes six hours to rise. Six or seven cakes can be made from the mixture. *The Top*: 1½ handfuls of sugar, 2 of flour—that means for each cake ¾lb. of butter or lard, melted. Flavour it with essence of lemon, vanilla, and cinnamon; a little nutmeg also. Rub the melted butter into the flour and sugar, then when the cake is ready to put in the oven rub it over with melted butter and put on the top. A few almonds can be chopped and sprinkled on. For an alternative top of cinnamon and sugar, apricots cut in halves and sprinkled with sugar can be used. Plums may be used in place of the apricots, or apples peeled and cut in quarters and sprinkled with cinnamon and sugar add variety." (Secretary, Mrs. Flynn.)

WILMINGTON (Average annual rainfall, 17.43in.).

November 8th,

HINTS ON COOKING FOR SHOW PURPOSES.—Mrs. M. A. Schmidt read the following paper:—"When the exhibitor has decided in which classes to compete, study the show catalogue and follow it closely. Do not deviate in the slightest from what the entry asks for. First prepare the ingredients, and do not put a pinch of anything more or

less than the recipe asks for, especially in the 'rising.' Remember this especially, for very often it is the cause of the entry not being on the prize list. Cakes are spoilt by just that pinch over which makes the cake rise too much, and the small holes in nice cakes evenly cooked are too big. The holes in a good cake should be uniform and small as well as even, and cut lightly and clean from the knife. The show catalogue asks for a collection of biscuits—six of each. On some plates there are five proper biscuits and one odd one is put in to make up the number. This spoils the whole entry and it is disqualified by the judge. Frequently the mixing is wrong—some make one mixing to do the lot or nearly so. This cannot be done and not detected. A couple of plates can be made out of one mixing, but do not make more, unless some spices or chocolate are added to alter the appearance. I advise nicely shaped biscuit-cutters for show purposes. Lightly ice if for fancy biscuits. The arranging often loses points for the exhibitor. Nice clean d'oyleys, linen or lace for preference, on an attractive open tray in small dishes may gain points. If plain goods are catalogued do not ice; if fancy goods, trim with a light hand, the less the better, so long as they are attractive, using for a finish a few silver cachous. Lamingtons are sometimes made from stale cake cut and dipped in chocolate and then the cocoanut is put over. If exhibiting Lamingtons in a show, make them medium size. For example, make a nice coffee cake or orange cake evenly cooked and make the Lamingtons out of that. A cake that crumbles and follows the knife is no good for show purposes. Sponges often appear to be all that can be desired, but when cut they crumble and follow the knife. A pound cake should be of a light amber colour and with a sprinkling of blanched almonds and peel. It should not contain too much fruit. *Coffee Cake.*—The mixture of these cakes is sometimes streaked with long portions of the eggs through their not being beaten properly. This is caused by putting the eggs into too warm a mixture. This spoils a good cake. *Bread.*—Sometimes the bread is so light that it crumbles when cut. This is caused by too much rising. Here again a fine, even texture will be the most successful entry. Often too much salt spoils the exhibit. Scones, like bread, should be a nice light mixture that cuts evenly. A good scone doubles up when cut or broken, and goes back to its original form. *Tomato Sauce.*—Often the catalogue says "best bottle of tomato sauce." There should be two entries in this section, and it is always a difficult class to judge. If not distinctly specified, the light sauce—with most judges—always beats the dark, because of the lighter colour. Competitors do not pay sufficient attention to the classing of their entries and put their exhibits in the wrong sections. Do not seal pickles too tightly. Many good entries are passed over because of this; grease-proof paper or waxed paper is quite sufficient. Do not exhibit four of a kind if three are asked for. Decorate the cakes lightly—a simple design well done is better than a more elaborate one done badly. *Sponge Classes and Butter Sponge.*—Cream the butter and sugar together. Do not melt it on the stove—a basin with warm water is better. Never put eggs into a hot mixture, or the cakes will be spotted with egg running through it. In all cakes texture, flavour, and distribution of fruits, &c., are essential. If a sultana cake, the fruit has a tendency to go to the bottom. There are three causes: too much rising, too loose a mixture, or too slow an oven. Pastry for meat dishes should have a little more salt than others, and be a dark-brown colour for fruit." (Secretary, Mrs. Cole.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Balumbah	14/11/34	7	Congress Report	Miss H. Jericho
Laura Bay	13/11/34	12	Congress Report	Mrs. R. Burke
Rendelsham	7/11/34	11	Christmas Gifts	Mrs. J. Bignell
Kangarilla	15/11/34	10	Discussion	Mrs. M. Steer
Kangarilla	22/11/34	37	Social	Mrs. M. Steer
Gladstone	20/11/34	50	Musical Afternoon	Mrs. L. Sargent
Williamstown	7/11/34	6	Formal	Mrs. A. Cundy
Parrakie	29/11/34	15	Social	Miss J. Halliday
Wilkawatt	20/11/34	50	Social	Mrs. A. Oram
Warcowie	27/11/34	7	Congress Report	Miss L. Martin
Parilla	—/11/34	30	"Dahlias," Mrs. F. Atze	Mrs. R. Welden
Rendelsham	5/12/34	11	"Christmas Recipes"	Mrs. J. Bignell
Belalie	12/12/34	25	Address—J. B. Harris	Mrs. E. Orchard
Snowtown	31/10/34	23	"Christmas Cooking," Mrs. Andrews	Mrs. A. Hocking

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. FEBRUARY, 1935. No. 7.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

River Murray Swamp Areas, at Wood's Point (Jervois Branch, Thursday, February 21st (F. P. Baily, Woods Point, Secretary).

Yorke Peninsula, at Kadina (Boor's Plains Branch), March 6th, S. G. Chynoweth (Secretary).

Mid-North, at Redhill, Thursday, March 14th (S. A. Pengilly, Secretary).

South-East (Upper), at Mundalla, Wednesday, March 20th (A. Ross, Secretary).

Lower North, at Blyth, Thursday, March 28th (R. H. Eime, Secretary).

South-East (Lower), at Mount Gambier, Wednesday, April 10th (G. T. Gurry), Secretary).

River Murray, at Moorook, Thursday, June 20th (S. Perkins, Secretary).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Artificial Manure Subsidy.

In a recent communication the Officer-in-Charge of the Fertiliser Subsidy Section of the Department of Commerce (G.P.O. Building, Adelaide) points out that the subsidy is payable on artificial manures used in the production of primary products other than wheat during the period 1st July, 1934, to 30th June, 1935. Forms of application are available at all country post offices, and when the particulars required have been filled in and forms duly signed and declared the forms should be forwarded to the supplier of the artificial manure who, after completing the certificate will forward the forms to the address given above. The Officer-in-Charge (Mr. S. Lillywhite) states that he will be pleased to furnish further information to Branches either by correspondence or by personal inquiry.

Cornsacks.

In the December issue we published the specifications of the standard cornsack. The Collector of Customs further states that, in respect to purchased cornsacks which are not of the standard prescribed by proclamation, if the marks and numbers of the bales, a sample of the faulty cornsack, and the name of the Australian supplier (or importer) be furnished to the Collector of Customs, the Department will make further inquiries into the matter.

Controlling Grasshoppers in the River Murray District.

In a report to the Grasshopper Control Committee, Mr. F. R. Arndt (District Horticultural Instructor) states that to deal with grasshoppers in the Renmark district the Irrigation Trust (which acts as a District Council for Renmark) has appointed a Director and ten Zone Supervisors. Each Zone Supervisor has a zone allotted to him, and his duties consist of searching his area for hatching grounds and in seeing that growers obtain their poison bait from him and use it to the best advantage in dealing with the insects. The Trust was practically confining its attention to the use of the poison bran mash, as it was found the most effective method of destroying the young grasshoppers.

The Blocks E and F district was the most badly infested of the Renmark settlement. With the Zone Supervisor (Mr. Petherick) Mr. Arndt inspected a number of hatching grounds. On one semi-neglected lucerne plot the holes made by the insects were very close together, and at one place as many as 640 holes where eggs had been deposited were counted on 1 square foot. On examining a number of holes it was found

that the eggs per hole averaged 40, which made the number of eggs for that square foot slightly over 25,000 All of the eggs were not deposited as closely together as the above but as the lucerne plot was over an acre in extent it must have contained many millions of eggs. Areas on which the hoppers were hatching out in great numbers were being treated with the poison bait twice daily—morning and evening—and were being destroyed in millions. The Wasp Parasite was found at work on many of the egg beds of the Renmark and other areas. On one large egg bed practically all of the eggs examined were found to be parasited with the small black wasp. The work being done by the Renmark Irrigation Trust was well organised and was proving effective in keeping the pest under control.

On 22nd January, together with Mr. N. Fotheringham (Manager of the Berri Experimental Orchard), Mr. Arndt attended a meeting of the Glossop Sub-Branch of the Returned Soldiers' Association and addressed the members on the grasshopper plague.

On the following evening he and Mr. Fotheringham were invited to attend a special meeting of the Berri District Council, and addressed the meeting on the grasshopper plague. The Council decided to appoint an Inspector to report on the presence of hatching areas and to organise methods for the destruction of the insects. On the 24th they delivered similar addresses to a special meeting of the Winkie Progressive Association. The meeting decided to elect a committee to assist and to work with the District Council in helping to eradicate the pest.

Mr. Arndt reports that he has also visited likely areas for the discovery of egg beds, discussed the grasshopper problem with a number of growers, and distributed leaflets on control methods. It appeared that the grasshopper problem was well in hand in the irrigated districts from Kingston to Renmark, and provided present efforts were continued, little damage from the plague should result.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of the following publications:—

"Frost Risks and Frost Forecasting." Price 6d. Published by the Bureau of Meteorology, Melbourne.

"Bee Keeping in Victoria." Price 1s. 9d., postage included. Published by the Department of Agriculture, Melbourne.

Rothamsted Experimental Station, Harpenden, England, Annual Report, 1933. Price 2s. 6d.

"Apple Packing," Bulletin No. 84. Price 1s. 3d. net. Published by the Ministry of Agriculture, England.

"General Catalogue Farm Machinery," published by H. V. McKay Massey Harris Pty. Ltd., 95-97, North Terrace, Adelaide. Copies will be sent post free on application.

AGRICULTURAL INQUIRIES.

Replies supplied by MR. R. C. SCOTT, R.D.A. (*Supervisor of Experimental Work*).

Flax Growing.

Strathalbyn Agricultural Bureau. "Contracts have been made with farmers in the Strathalbyn district to sow 700 acres of Flax during the coming season. What are the possibilities of this district for the cultivation of Flax and is the venture likely to prove successful?"

Reply—In a series of experiments conducted some years ago, it was found that fertile soils and good rainfall were necessary for satisfactory returns from Flax. The best returns were secured from the rich lands of the Mount Gambier district and the irrigated reclaimed swamp areas of the lower Murray. However, in these cases there

was no market for the straw and consequently returns were dependent entirely upon the yield of grain. If a mill is erected it would be worth while farmers attempting to produce the crop, but the area from which payable returns are likely to be secured is relatively limited. The most favourable areas appear to be the richer flats and the fertile land of the Ashbourne district, and so far as these are concerned, it is questionable as to whether Flax will be more profitable than the crops at present grown. It is understood that a price of £4 per ton has been mentioned, and consequently Flax is worthy of a trial, but it should be viewed entirely as an experiment. It should also be borne in mind that, unless a mill for the treatment of the fibre is available, the value of the crop is very much reduced.

Crops for Early Green Feed.

"Victor Harbour" asks "What are the best crops to sow to produce early green feed for sheep on sandy land in the Victor Harbour district, and is it advisable to sow with whatever cereal is recommended, Clover and Wimmera Rye Grass?"

Reply—Either Oats or Rye is recommended. For the lighter soils Oats are preferred, since they respond better than Rye when sown on land low in fertility. On the other hand, Rye makes a rapid recovery after grazing and in medium to good soils is a very valuable cereal for planting for this purpose. For the district under discussion, a quick-growing variety of Oats, such as Early Burt, Mulga, or Lachlan is recommended. So far as the inclusion of pasture seeds in the mixture is concerned, it is not wise to attempt the production of Rye Grass until the fertility of the land has been built up by the development of strong crops of Clover. Therefore, the addition of Wimmera Rye Grass to relatively new land is not advised, but there would be an advantage in sowing Subterranean Clover with the Oats. The Clover would have no difficulty in establishing itself in the Oat crop, provided sufficient superphosphate was applied and it would be the means of adding to the grazing later on in the year.

Nitrogenous Fertilizers on Stubble Land.

Cobram. "What is the value of nitrogenous manures for stubble sown crops?"

Reply—Experiments dealing with the value of nitrogenous fertilisers on stubble land have recently been conducted in this State. From the limited amount of work carried out, it appears that under special circumstances Sulphate of Ammonia has a definite place for stubble sown crops. These conditions are when, for some reason or other, the land does not naturally produce a strong growth of leguminous fodder in order to build up a supply of organic nitrogen. It follows, therefore, that on the older farmed land, where the residue from full phosphatic dressings has caused a strong growth of Clovers, Medics, &c., the addition of Sulphate of Ammonia has not proved economic. Where the natural pasture consists principally of non-leguminous species, the response is quite profitable. Consequently, the use of Sulphate of Ammonia depends almost entirely on existing conditions, but if plants of the Clover family are not plentiful in the natural pasture, a trial with this fertiliser on a relatively small scale would be advisable.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"Barmera" has aged gelding that has not shed his coat for the last three years. Other than appearing to be listless the animal is in good health.

Reply—I can suggest no remedy for the thick coat, except to clip him regularly. This can be done in winter as well as in summer. Give a course of Fowler's Solution of Arsenic (1 tablespoon in a small damped feed night and morning for 14 days,

stop for a week, and then continue the Fowler's Solution for another 14 days). Feed chaff damped, and see that bowels are kept regular by giving greenfeed, bran mashes, and small doses of linseed oil in feed, &c.

"Alawoona" has mare with staked hoof and is very lame.

Reply—Make a careful examination of the horse's foot (sole and frog) for any injuries or foreign bodies, and to do this satisfactorily the best way is throw the horse. If foreign body present, remove, and if any wound can be found this should be well opened up and treated with pure lysol. Further, stand the foot for 20 minutes in a tub of hot disinfectant daily. This can be done if you only make it warm for a start, and gradually add hot water. Keep the foot clean by putting in a sack.

"Elbow Hill" reports mare whose udder is swollen and discharging.

Reply—Rub the following liniment into the udder twice daily:—Green extract of belladonna, ½oz.; glycerine, 4ozs.; soap liniment, 6ozs. Keep mare on laxative feed.

"Mannahill" has two aged mares with hard lumps on the ribs. Foals from these mares also have lumps in the same position.

Reply—The trouble appears to be "Osteoporosis," a disease affecting the bones. It is a condition where the lime salts are removed from the bones, and they become enlarged through the deposition in them of increased amounts of organic matter (bone marrow). Any of the bones of the body may be affected with this condition, but those of the head and ribs are the ones most frequently involved. The exact cause of the trouble is still obscure, though it appears to be connected with some dietetic deficiency. The disease is more apt to occur in localities where, owing to the nature of the soil, the feed grown thereon or the stock drinking water is in some way affected. If taken in hand early a cure can often be obtained by simply removing affected animals right away to another district where they can get a complete change of diet.

Where this cannot be done, the animals should be fed as much as possible on food grown in another district, and the drinking water, if possible, changed. The diet should include a liberal allowance of oats, bran, &c. The addition of molasses to the food is also recommended, and a daily allowance of 1oz. common salt and 2ozs. sweet ground bonemeal should be given. If medicinal treatment is given, the animals should receive a mild dose of physic, followed by a course of the following tonic powder:—Ferri. sulph. exsic, 6ozs.; sodi. bicarb,, 1lb.; pulv. nux vom., 3ozs.; pulv. gentianae. 12ozs.; pulv. anisi, 1lb. Dose:—1 heaped dessertspoon to be given twice a day in damped food. If the condition is allowed to become well established before anything is done to check it partial recovery only is more likely to result.

"Gumeracha" reports sheep with a whitish opaque film covering the eye.

Reply—The disease is ophthalmia or "pinkeye." It is very contagious, and is usually introduced on to a farm with bought sheep. Treatment is as follows:—

1. Isolate all affected sheep. Put them in a paddock where water and shelter are available, and hand feed if necessary.
2. Both the *affected and healthy sheep* should be treated as follows:—
   (*a*) Remove all grass seeds from around eyes, and trim well around area.
   (*b*) Put a few drops of following solution in both eyes daily for a few days, and subsequently do affected sheep only till better:—Zinc sulphate, 1 dessert-spoonful; boiled water, ½ pint.

PIG-FEEDING QUERIES.

The following replies to questions submitted by the Secretary of the Blackheath Branch of the Agricultural Bureau have been supplied by Mr. H. B. Barlow, H.D.D. (Chief Dairy Instructor):—

1. *"In feeding pigs from slips to baconers would equal parts Cape Barley and Field Peas crushed be a better ration than Cape Barley alone?"*

A mixture of Cape Barley and Field Peas would be a better feed for pigs than Barley alone, and if the Peas can be obtained or grown cheaply the mixture is excellent.

2. *"When crushing grain for pigs is it best to crush fine or fairly coarse?"*

Grain should be crushed fairly fine, but not necessarily made powdery.

3. *"Is it better to feed crushed grain dry or mixed with their drink?"*

Better results are generally obtained by feeding the grain dry. Feed skim milk in a separate trough, and in addition have plenty of water available.

4. *"Is it known if the roots of bracken fern are of any food value to pigs running in them, as they have a tendency to root after the roots?"*

No analyses are available as to the food value of bracken fern roots, but there is no doubt that they are attractive to pigs and will help to make up a ration if crushed grain and skim milk are also available.

5. *"Would meat meal given to pigs more than repay the cost of same, by them coming to quicker maturity."*

If skim milk is available, meat meal is not necessary, but if no skim milk is available, meat meal fed at the rate of 5lbs. to each 100lbs. of grain is practically essential for quick and economical returns and will easily pay for itself if the pigs are well fed and looked after. Feeding meat meal to semi-starved pigs would not be economical.

. *"If rabbits were fed to pigs, would they take the place of meat meal, and should they be fed raw or cooked?"*

Rabbits can be fed in the place of meat meal. Skin the rabbits and boil with a little wheat and make a watery stew, then feed when cold. It is not necessary to clean the rabbits.

THE CONSERVATION OF FODDER UNDER SOUTH AUSTRALIAN CONDITIONS.

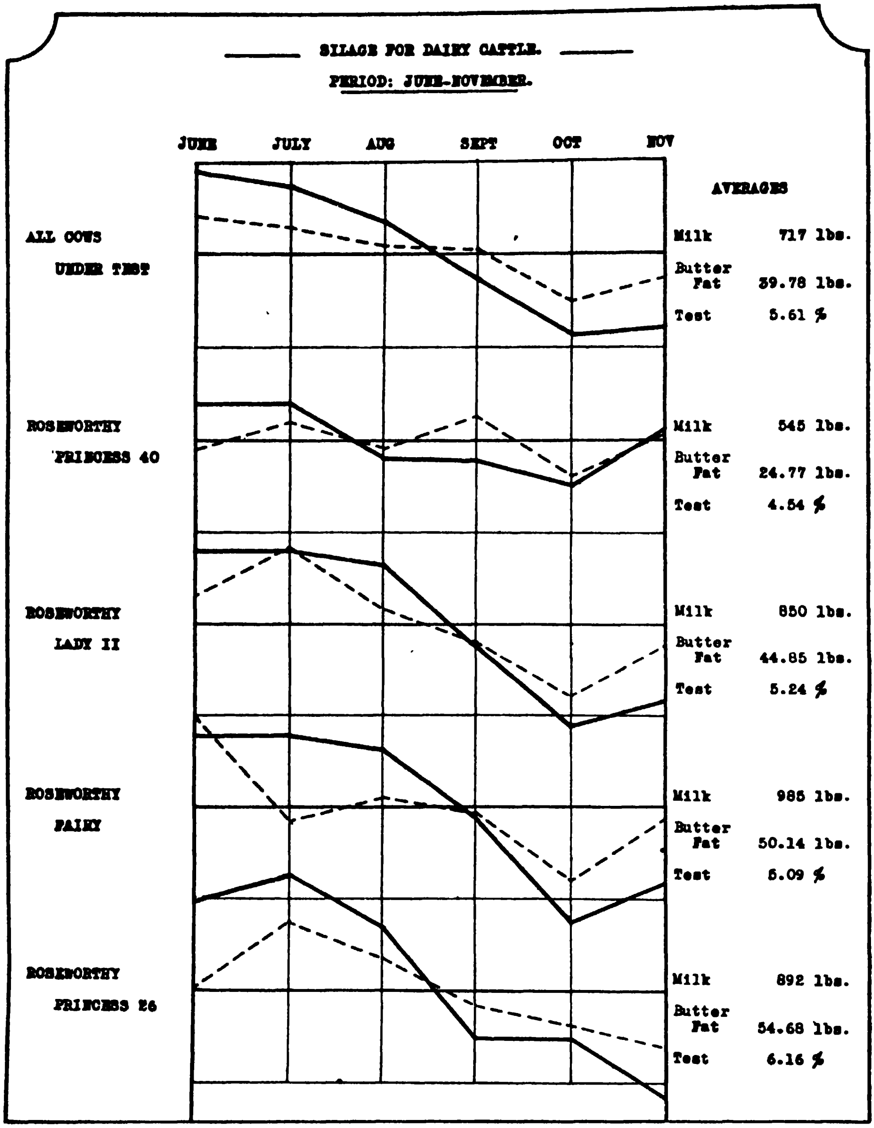
[Being the digest of an address delivered to the Annual Congress of the Agricultural Bureau of South Australia for 1934 by Dr. A. R. CALLAGHAN, Principal Roseworthy Agricultural College.]

On several occasions now I have drawn attention to the trend of agricultural development towards a more diversified system of farming by the tendency to incorporate and make more systematic use of livestock on the farm. Such a change has obvious agricultural advantages. This development is actually under way, and had financial conditions been better in the country during the last three or four years, considerable extension would have taken place. On wheat lands this new development, even though it must come about gradually, involves a re-arrangement of the rotational system in order to carry more stock. This in turn involves the development of a fodder conscientiousness which will have a psychological influence sufficient to compel every good farmer to conserve sufficient fodder to meet the requirements of his livestock over any severe seasonal or drought conditions which may occur. In my opinion there is no more important agricultural consideration in South Australia at the moment than fodder conservation; the lack of it is actually impeding further development, and I give the following reasons, which emphasise the need for more adequate provision in this regard.

THE NEED FOR FODDER CONSERVATION.

There are three basic reasons why conservation of fodder is so important under agricultural and pastoral conditions prevailing in this State, and in fact in Australia in general. *Firstly,* there is the need to preserve food grown at favourable times of the year in order to have a supply available with which to feed stock during the months of the year when very little or no paddock feed is available. To satisfy this need reserves are necessary, which may be termed regular seasonal reserves. *Secondly,* there is need to conserve fodder in order to utilise to the fullest extent the luxuriant vegetative growth, which characterises some seasons, for use as feed for livestock in years of drought, when definite and severe shortage of feed invariably occurs. These are best termed drought reserves, and should be considered apart from the regular seasonal reserves as something additional. One is on current account, the other in the savings account. *Thirdly,* a further object for conserving fodder is to have feed available with which to supplement paddock feed to maintain production or provide extra feed for energy production. These may be called supplementary reserves, and if the regular seasonal reserves are regarded as being on current account, and the drought reserves as a Savings Bank account, then the supplementary reserves can be looked upon as gilt-edged investments. Every successful business man realises the value of these three aspects of finance,, and in the same way every farmer seeking success in livestock pursuits must also pay particular attention to fodder reserves from all three angles.

In discussing these three aspects further, it can be said that for the most part the regular seasonal reserves do receive attention at the moment, but so far fodder conservation has stopped at that. In other words, the general policy of conservation at present is based solely upon the hand to mouth attitude of living. The wheat belt regions of Australia are characterised by winter rainfall and summer drought, with the result that summer feed shortage is a serious proposition. This is especially true under South Australian and Western Australian conditions.



In 1932 the College herd was on ordinary paddock feed until the last week in October, when silage was fed. Although all the above graphs were prepared from cows finishing their lactation period in November, when a normal decline in production is expected, definite increases occurred as a result of the change of feed. The first graph represents the production lines of milk (—) and butter (- - -) of all cows under test and finishing at the end of November. Note the increased production in November, whereas under normal feeding further decline would have been expected.

The others are of individual cows, and the lowest one is included to indicate that just an occasional cow in the herd is liable to decline in production in the first month of silage feed. Following the production of such cows later, however, definite and clear increases in subsequent months are noted after the cows become more accustomed to the silage. This latter type, however, is exceptional, and the general average of cows respond immediately to silage feeding after being on dry rations.

Taking the more favourable districts of the State, where this period of shortage in the summer is not so long and only acute in dry years, it is found that such districts do not have such mild conditions for vegetative growth in the depth of winter, consequently there is a short winter period of shortage to contend with as well. So that from the point of view of regular seasonal reserves alone it is fundamental to the success of livestock management on the farm that fairly extensive provision should be made. No district of this State can boast regular and continuous grazing conditions, and it follows, therefore, that in no district where livestock are a feature can fodder conservation be neglected if the best results are to be obtained.

On the subject of drought reserves, one need only refer to the rainfall records of the State or jog the memory of any experienced farmer to realise how insistently and regularly the need arises for extensive feeding of livestock to carry them over the drought periods which are part and parcel of our climate. Records and experience have warned the producer time and again to be prepared, yet even this year, when a dry spell followed comparatively good years, during which feed was literally wasted, the shortage of reserves in South Australia make one wonder why records are kept or experience is registered. Whenever drought does appear it finds with monotonous certainty the average farmer unprepared. Shortage of vegetative growth coincides with the recurring years of drought, just as luxuriance of vegetative growth greatly in excess of normal requirements coincides with the recurring years of high rainfall. It is during these years of plenty that adequate provision should be made to tide our livestock over the periods of shortage. Just as regular seasonal reserves are necessary to equalise the carrying capacity of the normal year, so drought reserves are necessary to equalise the carrying capacity of the State over good and bad years. It is the only sound commonsense way of preventing excessive fluctuations in livestock numbers and excessive fluctuations in products of all descriptions obtained from livestock.

By adding a little extra to the regular seasonal reserves every good year, or, better still, by making a determined effort to build up adequate reserves in the years of plenty, provision against serious drought losses can be made at comparatively little cost. Merely the cost of handling is involved in most cases, whereas, if unprepared, not only handling and rehandling costs are incurred, but the fodder itself has to be purchased at famine prices. In my opinion it is a very bad business proposition not to have sufficient reserve to carry stock over at least 10 months of the year. Apart from acting as an insurance policy against losses, it offers a sense of security and satisfaction which every farmer should enjoy.

This leads to the next aspect of fodder conservation, and that is the need for supplementary reserves, and, in discussing these, the quality of the fodder conserved is important. To the successful dairy farmer the conservation of fodder in suitable form is perhaps his most important problem; maintenance of production at as high a level as possible can be done most economically if farm-grown fodders possessing desirable qualities have been conserved. There are periods of the year when the feed is scarce or unnutritious, and the dairy farmer is faced with the problem of conserving fodders to answer requirements of succulence, bulk, and a balanced ration. This actually entails provision of succulent reserves of the form of silage, another bulky fodder such as hay, and concentrates in the form of cereal grain, preferably oats, in order to keep his rations balanced.

The same principle underlying the use of supplementary reserves applies to other livestock, especially in the production of fat lambs, and to make provision for extra energy expenditure on the part of horses. Horses in heavy work need extra feeding, and for the most part farmers do provide reserves sufficient

to carry their horses through a normal year's work, but it is appalling to note this year that in many districts fallowing has been considerably curtailed for the rather shameful reason that insufficient horse feed of desirable quality has been conserved on a great many farms to tide them over the present dry season. Thousands of fat lambs have missed the market this year because of the dearth of the right type of fodder reserves. The conclusion is that it is impossible to guarantee any continuity of supply of animal products from season to season and year to year unless fodders of the right type and balance are conserved to tide over seasonal feed shortages and drought shortages. In putting such reserves aside, due regard should be paid to their feeding value and utility; fodders of high feeding value economise space and make feeding thrifty.

Taking the three fundamental reasons for fodder conservation into consideration, it will be apparent that such a practice not only acts as an insurance against loss of stock, but it also operates as an insurance against serious decline in production. Well carried out it would assure a continuity of supply at present undreamt of in many animal products and increase the carrying capacity of most properties. At the same time such carrying capacity would be placed on a true and permanent basis extending over the whole year round, and from year to year, in spite of dry seasons. The average property in South Australia is not stocked to full carrying capacity, and it is therefore not yielding full returns. By conserving fodder the owner can stock up to full capacity and yet feel confident that when the dry spell occurs he will not be forced to sell his stock at starving stock prices or buy fodder well above its actual feeding value.

The Present Position.

The only aspect of the problem which has so far received due attention is that of providing the normally required seasonal reserves. These are chiefly conserved as hay and to a lesser extent as grain. While such a position may seem satisfactory in average years, it is certain that if more suitable and more extensive reserves were made an increase in production of animal products would undoubtedly be possible.

Table showing the Livestock Carried in South Australia, 1931-32, together with the Fodder Conserved in the form of Ensilage and Hay.

District.	Ensilage.	Hay.	Dairy Cattle.	Other Cattle.	Horses.	Sheep.
Central	5,216	250,593	62,995	38,538	55,377	1,332,449
Lower North	230	165,946	17,526	13,282	38,098	954,230
Upper North	15	46,481	8,175	9,131	12,827	720,407
South-East	84	28,829	17,230	19,580	13,042	1,276,646
Western	30	74,073	6,626	5,060	23,724	817,661
Murray Mallee	65	80,956	14,854	11,030	30,490	444,077
Outside Countries	—	180	350	40,947	11,664	1,063,511
	5,640	647,058	127,756	137,568	185,222	6,608,981

It must be admitted that provision of drought reserves is seriously neglected. The above table shows that, apart from thousands of dairy cows and horses, there are millions of sheep in our country, and thousands of other cattle. Thousands of fat lambs are produced annually at certain periods of the year. All these livestock are at the mercy of a dry year as the amount of fodder conserved indicates, and only by a proper systematic and conscientious programme of fodder conservation can their wellbeing remain assured in spite of bad seasons.

So far insufficient attention has been given to the type of fodder to conserve; there is an easy going tendency to trust to luck and depend upon cereal hay. Such apathy towards the problem of fodder conservation means the loss of thousands of pounds annually to the producers. In such a climate as ours dairy farmers can ill afford to neglect to conserve fodder in the form of silage, yet an analysis of the figures given above from the viewpoint of silage reserves in relation to the number of dairy cattle is very illuminating. The second table transcribes the figures and defines the ludicrous position quite clearly.

Ensilage Manufactured in 1931-2 in Relation to the Number of Dairy Cows for the same Period.

District.								
Central	185lbs.	per head	@	40lbs. per day	equal to	4·62	days	ration.
Lower North	29 "	" "	@	" "	"	0·72	"	"
Upper North	4 "	" "	@	" "	"	0·10	"	"
South-East	10 "	" "	@	" "	"	0·25	"	"
Western	10 "	" "	@	" "	"	0·25	"	"
Murray Mallee	9 "	" "	@	" "	"	0·22	"	"
Whole State	98 "	" "	@	" "	"	2·45	"	"
Western Australia	393 "	" "	@	" "	"	9·82	"	"
New South Wales	121 "	" "	@	" "	"	3·02	"	"
Victoria	15 "	" "	@	" "	"	0·37	"	"
Queensland	18 "	" "	@	" "	"	0·45	"	"

Taking the State as a whole, only 98lbs. of ensilage per cow are conserved annually. After allowance for normal manufacturing losses, this would amount to no more than 70lbs. at the very most. Allowing a daily ration of 40lbs. on the basis of fodder ensiled, which is equivalent to no more than 25lbs. to 30lbs. of actual silage, it will be seen that there is only sufficient silage made in this State to give our dairy cows about three good feeds. The data indicate that the position in Western Australia, where they labour under very similar climatic disabilities, is four times better than in this State.

These figures are really startling to anyone who knows the real worth of silage as feed for milking cows. They are more significant when it is recalled that during the early part of this year State production of dairy produce dwindled almost to half the normal production for similar periods of normal years. Adequate reserves of succulent fodder in the form of silage and concentrates in the form of grain would have largely allayed this serious decline in production.

It has been impossible to obtain figures relating to grain stored as fodder reserves. For the most part the storage of grain is based more on hope of a rise in price than on the fear of drought.

By way of summating these remarks on the present position of fodder conservation, it is apparent that, although some attempt is being made to meet regular seasonal feed shortages by the storage of large quantities of hay, only a very feeble attempt to ensile fodder as silage is being made. In fact at present conservation of fodder is based upon haphazard, happy-go-lucky methods, when only careful attention to the requirements of animals and the pursuance of a systematic policy of food storage will suffice.

Methods of Fodder Conservation.

There are three main forms in which fodder may be conserved—(1) as hay, (2) as silage, and (3) as grain. Under the general run of South Australian conditions cereal hay is the chief concern; some grass or meadow hay is made in the more favoured districts, but the chief reliance is placed upon wheaten, oaten, or shandy (wheaten and oaten mixed) hay. Silage, as already shown, is not being made to anything like the extent it should be. Of the cereal grains, wheat, oats, and barley all form very useful reserves, but of the three oats will be found to be of more universal use.

I do not intend to embark upon a detailed account of the ways and means whereby these fodder reserves can be built up, but I will endeavour to draw attention to salient features which I consider may be helpful.

Hay.—Haymaking requires little explanation, but there are one or two points which are not clearly understood, and as a general rule if greater care were taken in making hay, its feeding value would be very greatly increased. The time of cutting is extremely important if the highest nutritive value is to be combined with optimum weight. Nutritive value should not be sacrificed for weight, consequently the grain should not reach the dough stage, for by then the lower portions of the plants will have dried out, become less nutritious, and less digestible. The nutritious elements are evenly distributed throughout the plant at flowering and they are then in very digestible form. No substantial changes in the distribution of nutriment nor in digestibility occur in the plant from flowering until the milky stage of grain development. At this stage the grain has almost taken on its full size, but from this milky stage on a very rapid translocation of food substances takes place from the stems, especially the lower portions, to the grain, and this is accompanied by a similarly rapid decrease in digestibility. Actually, therefore, to combine optimum weight with optimum distribution of food substances and digestibility, cereal hay should be cut after the plants have flowered and the grain is in the early and late milky stages. At this stage, also, good colour, pleasant aroma, and retention of leaf can be expected, all of which contribute largely to the palatability of the hay.

Another point is that once cut hay should be carefully handled so that its natural qualities may be fully and well preserved. The idea is to bring about loss of moisture without loss of nutritive value, colour, or aroma, but if the fodder is allowed to become too dry the actual maturation or finishing touches in its manufacture may not be possible. If it is stacked after completely drying out there is not only serious loss through the bleaching action of the sun, but loss of colour as well. Leaving it so long also leaves it exposed to the chances of rain, which is a very potent agent in reducing the soluble nutrients. It is not commonly realised that rain can remove as much as from 15 per cent. to 20 per cent. of the nutritive value from exposed hay. Actually the hay should be carefully stooked and carted in when it is sufficiently dry to be stacked with safety. This stage is reached when the nodes or knots on the stems have dried and when the stems are sufficiently brittle to break when screwed in the hands. If stacked in this condition there will be sufficient moisture left in the hay to permit of a mild mellowing fermentation in the stack, which is very desirable, without in any way endangering the stack from overheating or the development of moulds.

The careful handling of grass or meadow hay is necessary for the same reason, and the nutritive value of the product can be quite appreciably controlled by care and skill in making. Once in the swath the cut fodder is subject to very rapid drying under our conditions, and if it is allowed to dry this swath, losses of valuable feeding substances are extensive. The idea of making small heaps or "cocks" as soon as wilting of the swath has taken place is to keep the leaves as fresh and moist for as long as possible; in this condition they draw moisture from the thicker stemmy portions of the plant without themselves becoming brittle and fragile. If the leaf is allowed to wither rapidly and become brittle, it will be lost in handling and the most valuable portion of the harvest will be lost. From the cocks, meadow hay should be built into the stack before it has completely dried out, and it should respond as a whole to tramping and give evidence of settling down well. If it is too dry it will not settle compactly or respond to tramping in the same way.

Hay may be considered to be the ideal fodder to conserve for maintenance and dry feed rations to meet the regular seasonal shortages. As a drought reserve it has some serious drawbacks, chief of which are that it is subject to yearly deterioration as a whole, it is generally exposed to the weather, it is open to the ravages of rats and mice, and always in danger of fire. In fact, the annual wastage from conserved hay is enormous, for working in harmony with the influences of weather, rats, mice, and general deterioration, carelessness on the part of the owner also contributes largely to the loss. If hay has to be kept for any length of time more adequate protection is necessary, and the advisability of erecting suitable hay sheds, offering protection from mice by building on guarded straddles or encircling the stack with a low galvanized iron fence, must be given consideration. In addition an insurance policy against fire is necessary.

After having made such provision, only by great care can hay be stored loose in the stack over long periods. Under a shed the hay is given adequate protection from the weather. Elevated straddles protected by inverted plates of galvanized iron are certainly a great protection against mice. Similarly the low galvanized iron fence of from 2ft. to 3ft. high and set in the ground about 6in. offers protection against mice. In spite of such precautions, however, careful vigilance is necessary to prevent the ingress of rodents. Sticks, bags, straws, or any other objects which are permitted to hang over the protections to the ground level give mice every chance of entering the stack. During seasons when mice are bad the iron fence should also be watched to prevent entrance to the stack by burrowing. Haystacks that are intended as drought reserves should be given the attention referred to above. This would prevent much of the enormous hay waste which is such a common sight in the country.

Probably the most economical and faithful method of conserving hay for long periods is to bale it, for in this form it keeps better, occupies far less space, and when the time comes for its use it is easily and quickly transported. It is erroneous to suppose, however, that baled hay is mouseproof; it is the reverse, as the crevices between the bales form very happy hunting grounds for mice, and all baled hay should be given the same protection against mice as outlined above.

The harvesting of hay, especially oaten, before the grain has developed is advocated as a protection against serious mouse trouble, but optimum weight of hay, which is often a consideration, cannot be obtained if the cereal intended for hay is cut too early, and difficulties in curing immediately present themselves. Then, in years of serious mouse plague it is doubtful whether the mice will discriminate between hay of such calibre and that of ordinary composition.

Silage.—Whatever disadvantages the storage of hay as drought reserves may have it is still absolutely necessary as there is no more serviceable way of conserving fodder for horse feed. The placing aside of reserves for sheep or cattle, however, is a different proposition, and in view of the depredations to which hay is subject, the manufacture of more cereal silage is unequivocally advocated.

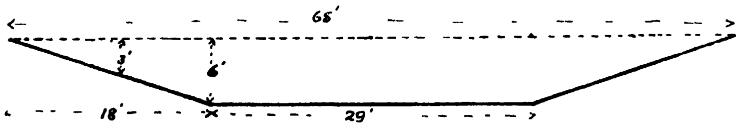
Undoubtedly the most economical and sensible way of ensiling fodder is in the trench silo. The next most serviceable method is the stack. Where loose stacks of grass, clover, or lucerne silage can be made, they can be weighted down and remain sound and undisturbed for many years without depreciating to anything like the extent expected in hay. The building of ordinary cereal stacks of silage I do not advocate, for such stacks have to be built in much the same way as a haystack. Besides being difficult to make and keep standing, it is almost impossible to drive the air out on account of the locking and crossing of sheaved bundles. This involves a heavy manufacturing loss as well as a wide marginal loss; further, such stacks are subject to depreciation and must be used within 12 months to get full benefit from them. Sheaved cereal fodder can be successfully stacked, however,

by means of the pole-guided stack which has been tried very successfully at College and this method is definitely favoured where it is not possible to use trenches as silos. The overhead silo is too expensive to construct merely for conserving drought reserves, but it has its place on dairy farms and stud stock properties where silage should form such an important percentage of the regular seasonal, and supplementary reserves.

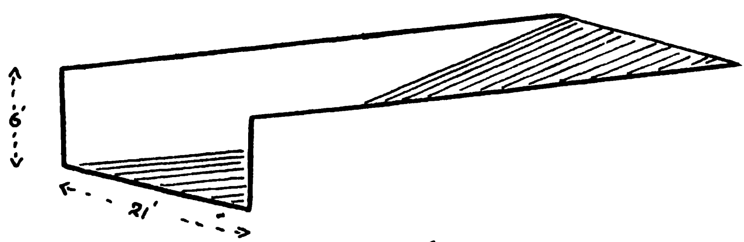
Details of the silage harvest at College last year were published in the September *Journal of Agriculture* and full descriptions of the loose grass silage stack and pole-guided stack have been given, but no trench silage was made so that in the notes to follow special attention will be given to the trench silo.

The Trench Silo.—The site is the first consideration and unless a good sound sub-soil is available on a well-drained spot where there is no danger of seepage into the trench or flooding, then it is preferable to build stacks. In most districts, however, trench silos are possible. The trench should not be made too large or too deep and a pit to hold 100 tons is recommended. If the property is a large one carrying a large number of stock, the size can be increased, but on the average holding it is preferable to have two trenches of 100 tons capacity rather than one of 200 tons.

A trench measuring 65ft. long, 21ft. wide, and 6ft. deep, designed upon the lines illustrated below, will hold 100 tons. Another conveniently dimensioned pit of similar capacity would be 80ft. long, 14ft. wide, and 6ft. deep.



"Side Elevation"



"Half Section"

Scale $\frac{1}{10}$" To 1 Foot

These can be conveniently made with end batters allowing for a rise of about 1ft. in every 3ft. The sides, however, should be as near perpendicular as possible, the width being perhaps 2ft. wider at the top than at the bottom. This can easily be made by using a single-furrowed plough and scoop.

Deeper trenches than 6ft. are more expensive to make and more difficult to empty, so that greater depth is not advocated. The trench type is undoubtedly the most convenient way of handling cereal material.

There are no difficulties in filling such a trench, but the following hints may be useful. The sheaves should be placed lengthways in the pit; the bands need not be removed, but they may be cut to facilitate packing; but this is not necessary for success. After a fair body of material has been unloaded over the sides the wagons can be drawn to the pit with advantage and unloaded. To secure good packing, especially along the margins of the silo, a horse led backwards and forwards over the material between loads has been found very helpful. After the

silo has been filled to a little above ground level, a period of two to three days should be allowed for settling, then resume the filling and stack the material to a height of about 4ft. above ground-level at the centre, and gradually sloping away at both ends. In this process of stacking above ground-level it is a good plan to allow the sheaves to overlap the edges of the trench by about 6ins., then when subsidence takes place the overlap is drawn into the pit along the margins; this acts as a very effective means of obviating shrinkage from the walls of the trench. The material should again be allowed to settle, after which it should be built up to 4ft. in the centre as before. This is a safeguard not to be neglected, as the material settles very appreciably as fermentation proceeds, and if the finishing is not methodically done, a few months after filling and covering the settling may bring about a hollow over the pit which may become a water-hole saturating and spoiling the fodder below. After the final filling further settling should be allowed, preferably with some weight on top to assist, after which it can be covered with a foot or more of soil.

The Pole Guided Stack.—The idea of this type of stack is to build a framework of poles along both sides. The stack frame at College was designed to hold about 90 to 100 tons, and the dimensions were 21ft. by 12ft., and the poles were 22ft. out of the ground. Along the two sides long poles were placed firmly in the ground 3ft. apart. At the moment two frameworks are being constructed at the College to make a permanent demonstration of this type of stack, and for the purpose railway irons 27ft. long are being used. These will be set in concrete 5ft. and will be 22ft. out of the ground. The base measurements will be 27ft. by 14ft. 6ins., and the railway irons taking the place of poles will be placed 3ft. apart on both sides.

For a stack to take 100 tons a farmer who is able to get long poles conveniently, the dimensions 21ft. by 14ft. 6ins. are very convenient, and if raised to a height of 20ft. and filled to that height, say, three times after allowing for settling, 100 tons of green stuff would be required.

The secret of this type of stack is that it enables the stack to be built with sheaves in parallel fashion, and not with the butts to the outside of the stack, except at each end. It is advisable when building to lay one layer with the heads all one direction, the next layer with the heads the other way, and so on, so that at each end the heads protrude over the edge of the stack in alternate layers. These are then trimmed level with the butts of the alternating layers, and thrown back into the stack. This parallel stacking of the sheaves is made possible by the poles, and it is the most important attribute to the method, for the parallel stacking enables much better compaction and general packing of the fodder, and it guarantees the exclusion of air quicker and far more effectively than if the stack were built on the haystack principle, where sheaves are criss-crossed to bind them together. Further, the poles facilitate building and make the chances of serious slipping of the stack during building and settling very remote. It is a method than can be recommended with assurance, and, in fact, is the soundest method available for the stacking of sheaved wheat, oats, or barley.

The Loose Stack.—For handling pasture, clovers, or lucerne as loose material an ordinary round stack is the most desirable. The base for a stack to take 100 tons of green fodder should be 24ft. in diameter and no more. This means building to a height of 18ft. to 20ft., and allowing to settle and rebuilding say three or four times according to subsidence of the fodder. To handle the fodder at College an attachment was made to the mower, which rolled the fodder into light windrows. The fodder was then taken by sweep rakes to the site of the stack, tipped, and later elevated on to the stack by means of grab and tackle. This handling is quick, economical, and easy.

The weighting of these stacks is not so essential after each day's work as in handling sheaved fodder, as it settles down readily, and provided a fair quantity is added each day, it will make excellently in normal spring weather which is not too drying.

The advantages of silage are many, but to enumerate them at length would be mere repetition of long standing advice. Suffice it to say that silage is vermin, fire, and weather proof and, well made, can be preserved in succulent nutritious condition for much longer periods than hay. Its succulence places it in an unchallenged position as bulky fodder for dairy cows or ewes suckling lambs.

The Storage of Grain.—Most farmers are inclined to talk bulk-handling at the slightest provocation, but very few attempt to practise the bulking of grain in large bins, or silos, in order to store it effectively. Grain cannot be stored for any length of time in bags. There it is subject to vermin of all descriptions and enormous waste and the eventual rejection of much grain is inevitable. Some kind of galvanised iron container is necessary and in this regard galvanised iron tanks serve the purpose well. At College we have recently divided one side of an old barn which has mouseproof walls and flooring into four bins each of 600 bag capacity. The divisions and inside walls are of galvanised iron supported on a timber framework. All our grain reserves are bulked into these bins from which grain can be gravitated out for crushing or direct feeding.

In New South Wales the storage of oats in special galvanised iron silos has become very popular and as a rule these silos are designed to hold about 600 bags of grain. Such silos can be constructed of 22 gauge iron but if silos to hold greater quantities are desired, the lower layers should be of 20 gauge with the upper iron 22 gauge. It is preferable to have all joints both riveted and soldered; in any case the lower junctions must be riveted and soldered, even though the upper junctions may be only rivetted or securely joined by screw bolts and made watertight by reasonably waterproof packing. Angle iron may also be used to support the sides with advantage.

These silos are filled through a chute near the top, and in some of the larger ones another door halfway down allows filling at lower levels to be done manually. Normally the grain has to be elevated to the top of the silo by means of a hoist, or another method is to have a stand from which the grain can be tipped in. A small doorway at the bottom allows for emptying; in this regard two doors, one on either side, are of great help and facilitate the emptying when the grain is at a low level in the silo. The use of the sliding door from the grain box of any old harvester serves the purpose admirably.

Grain placed in such silos must be perfectly dry; it will then keep in sound condition, free from vermin, for indefinite periods. If fouled at all by rain, or if placed in the silo other than perfectly dry some sweating and the ingress of weevil will result. With the sign of any vermin the following fumigation, using carbon bisulphide, will be found effective. Pour the carbon bisulphide into shallow flat containers or on to bags on top of the grain. Where the silo is reasonably airtight, four pints of the chemical to every 1,000 bushels of grain-holding capacity is sufficient. Even though the silo be only half full the same amount would be necessary as for a full silo. If the silo is not airtight increase the quantity up to 4 times the amount and if possible cover the grain with a tarpaulin after adding the fumigant. It should then be left for about 48 hours. Carbon bisulphide is highly inflammable, but is not over-poisonous to humans and it is possible to work in the silo for about 10 minutes without danger. For convenience of measurement the following relationships are worth remembering; 1,000bush. are the equivalent of 8,025galls., occupying 1,284 cub. ft.

In this somewhat rambling discourse I have endeavoured to emphasise the absolute necessity which exists for more general and serious fodder conservation and at the same time have offered a few practical suggestions which, it is hoped, will be of assistance. The inauguration of fodder conservation competitions throughout the State would draw attention to the need as well as encourage further development and I would commend to this Conference the idea of placing on record their desire to see such competitions begun. Following an expression of desire for these competitions from this meeting I feel sure that support from the Department of Agriculture, livestock organisations, and the Royal Agricultural and Horticultural Society would be forthcoming.

THE REMOVAL OF SPRAY RESIDUE FROM APPLES AND PEARS.

[By A. G. STRICKLAND, M.Agr. Sc., Deputy Chief Horticultural Instructor.]

The necessity for using sprays of various kinds in order to protect ripening fruit from insects and diseases is universally recognised.

Such sprays are customarily applied at certain intervals during the growing season, and often up to a few weeks before the fruit is harvested, and despite natural weathering, some of the applied spray must be present in greater or less amount on the harvested fruit. In a wet summer, spray residue is removed at a relatively rapid rate, and it is, therefore, in dry seasons that spray deposits are most conspicuous and persistent.

The presence of spray residue on marketed fruit may be objected to on two grounds:—

Firstly: The arsenic content of the fruit may exceed the legal maximum prescribed by Health Authorities; and

Secondly: Spray residue, dust and other deposits may be present in such amount as to detract considerably from the appearance of the fruit. Bright, clean apples and pears are far more appetising than fruits which are spotted or smeared with foreign substances, and it is always the grower's endeavour, or it should be, to market his fruit in the most attractive condition possible.

Prevention is ever better than cure, and before discussing methods of cleaning fruit, I will make short reference to possible methods of avoiding excessive residue. The tendency for lead arsenate sprays to leave an objectionable residue has prompted extensive trials of other spraying materials for codlin moth control, but although in some instances over 100 possible substitutes have been tested, no spray has yet been devised that will universally replace arsenate of lead. One of the most promising of these substitutes, namely, Barium fluosilicate, was tested recently, but it gave such poor results that ultimately arsenical and oil sprays had to be brought to the rescue in order to save the fruit. White oil emulsion, as an adjunct to earlier calyx sprays with arsenate of lead, has given better results in moth control and reduction of residue than any other substitute for arsenicals. Experiments in various States have shown that two sprayings of lead arsenate, followed by subsequent sprayings of White Oil emulsion, give efficient control of codlin moth, and at the same time arsenical residue is kept practically within legal limits. The efficacy of this and similar programmes is still being investigated.

Where harvested fruit still bears excessive residue in spite of the use of oil sprays in substitution for some of the arsenical applications, the fact that oil has been applied greatly complicates the problem of removing the residue. A residue of arsenate of lead is removed with little difficulty, but if such a residue has been coated with a film of oil it is not so easily got rid of. Pending the results of various spraying and washing experiments, it is urged that if the inclusion of White Oil in the schedule does not satisfactorily avoid residue, then in the interests of removing the spray marks, it would be far better to omit the oil altogether. Most trouble in this respect is experienced, when, after putting on several sprays of lead arsenate and achieving a fairly heavy residue, the orchardist closes his spraying season with oil. This practice seldom has the effect of dispersing the spray deposit, and serves merely to render the fruit unhappily resistant to any cleaning process which may be employed.

Generally speaking, a complete schedule of lead arsenate sprays will leave more or less residue, depending on weather conditions and methods of spraying. The subsequent removal of this residue is greatly facilitated by the addition of 1lb. to 2lbs. of hydrated lime per 100galls. of lead arsenate spray, when making the final

applications. Growers are advised to add this lime to the last spray of lead, when it seems likely that they will have to take steps to remove the residue after the fruit is picked.

We now come to the question of removing spray deposits, which are sometimes unavoidably present when the fruit is picked. Recently there has been a tendency on the part of Health Authorities, both in Australia and Overseas, to enforce the regulations regarding spray residue more stringently, and to protect themselves, growers must avoid marketing fruit with excessive residue.

In the past, hand wiping has been employed, to remove excess spray, but during the last year or so, many growers have taken advantage of the less expensive, and more efficient method of washing the fruit in a weak solution of hydrochloric acid. Nevertheless, a large number of growers still have the idea that washing apples and pears is an expensive and complicated procedure. This is, definitely, not so. The labour costs for washing are far cheaper than for hand wiping; the residue is more thoroughly removed, and the process itself is very simple to carry out. If large quantities of fruit had to be treated, as in a central packing shed, the use of a machine would become necessary, but the average grower requires no further equipment than two moderate-sized wooden troughs or tubs, and some sort of a water supply.

Hydrochloric acid may be purchased from chemical or fertiliser companies in a concentrated form, containing about 33 per cent. actual acid. It is supplied usually in 35lb. jars (containing about 3galls.), and the price varies from 2½d. to 3d. per pound according to the quantity purchased. On these prices the concentrated acid costs approximately 2s. 6d. to 3s. per gallon. In this form, the acid is very corrosive, and should be handled with the greatest of care. Splashing should be avoided when pouring it, and a supply of hydrated lime or common baking soda should always be handy for the purpose of neutralising the acid should it be accidentally spilt.

Proper washing of apples or pears only requires 1gall. to 3galls. of this commercial acid per 100galls. of water. Light residues will be removed with the minimum

strength of 1gall. per hundred, but for heavier or more difficult deposits the strength will need to be raised to 2galls. or 3galls. per hundred of water. When preparing quantities of solution less than 100 gallons, correspondingly smaller quantities of commercial acid are used.

The essential equipment for treating fruit with this solution consists of two wooden troughs or tubs—one to hold the acid solution, and the other to contain fresh water for rinsing the fruit after treatment in the acid.

All decayed and bruised fruits are sorted out prior to packing the fruit in boxes for dipping. Any convenient box is suitable for holding the fruit while dipping, provided that it has slatted sides and bottom, which will enable rapid drainage when the box is removed from the bath. Kerosene boxes are unsuitable, because of their poor drainage facilities. Apples should not be submerged deeply in the solution, and shallow trays or long bushel cases on their side, constitute containers which will prevent too deep immersion in the bath. A loose fitting cover to the box or tray is also necessary when dipping apples, in order to prevent fruit from floating out of the box.

For pears, the boxes need not be shallow—they may be submerged deeply in the solution—and as pears do not float, no lids are required for the dipping boxes.

The box of fruit is placed in the acid trough, and plunged up and down for a period of two minutes in the case of 1 per cent. acid and 1 minute in the case of 3 per cent. acid. It is then transferred to a draining board, which slopes back into the acid trough; here the box is allowed to drain for one to two minutes. When draining is complete, the case is moved into the rinsing trough, which should contain circulating fresh water. Here it is plunged up and down again for a further one or two minutes, and finally placed on a second draining board, sloping, this time, into the rinsing bath.

Whilst on this last draining board, it is desirable to give the fruit a final rinse by thoroughly sousing it with a hose. This hose may be left running into the rinsing bath, and with provision for an overflow outlet to the trough, a constant change of the rinsing water takes place. This is highly desirable in order to ensure absolutely thorough rinsing of the fruit. Failure to rinse the fruit properly after it has been through the acid may cause subsequent injury during storage, and the necessity of adequate rinsing cannot be stressed too strongly. No injury to fruit will occur with proper rinsing, and a very simple test is available for determining whether rinsing has been complete. The tip of the tongue will detect very minute traces of acid, and if applied to the calyx end of a rinsed apple or pear will give a good indication of the efficiency of the rinsing treatment. A sharp stinging sensation on the tongue is evidence that all traces of acid have not been removed.

The use of running water is not always possible, and in such cases the water in the rinsing bath must be changed frequently. It is not impossible to rinse in still water, provided that the water is changed after the equivalent of 50 cases of fruit per 200 gallons of rinse water has passed through the bath. If lime be added to the rinse water, the quantity required may be halved. It will be readily understood that without adequate water, the washing treatment cannot be used.

Although the rinse water requires frequent renewal, the acid solution does not lose strength very rapidly, and 50galls. of the weak solution will treat about three or four hundred cases of fruit before the necessity for renewal occurs. If dirty or decayed fruit is passed through the bath, however, it may be necessary to change the solution more frequently. Between renewals of solution, both troughs should be thoroughly disinfected with a weak solution of formalin, in order to prevent the accumulation of mould spores.

Removal of residue by the process which has been briefly described should be carried out soon after picking—especially in the case of apples; otherwise the fruit will, in the course of time, develop a protective coating of wax, which impedes the action of the acid, and makes cleaning very difficult.

FARM SHEEP AND WOOL.

[By C. A. GODDARD, R.D.A. (Asst. Wool Instructor, School of Mines).]

The farm flock has rapidly increased in importance, and has now a definite economic bearing on general farming. It can no longer be looked upon as a sideline, because it ranks among the major farm operations. By the judicious management of sheep the rotation may be widened, fertility increased, and the cost of production reduced.

The farm flock has not received the attention from farmers that it deserves, either from a breeding or a managerial point of view. Sheep are too often looked upon as fallow scavengers, and the quality is frequently so low that profitable production is impossible. It is not economic to keep poor producers, nor, as often happens on farms, to neglect the flock. Sheep of a reasonably high standard and well cared for are excellent producers. There is probably more scope for development along breeding and managerial lines with the farm flock, than in any other form of agriculture.

In this article it is proposed to deal with the subject in three sections:—

i. The Establishment of the Flock, and General Breeding Principles.
ii. Management.
iii. Shearing, Grading of Wool, Marketing of Wool.

THE ESTABLISHMENT OF THE FLOCK, AND GENERAL BREEDING PRINCIPLES.

It is necessary to subdivide this section as follows:—

i. When lamb for export is the first consideration.
ii. When the flock is maintained for the dual purpose of "Lambs" and "Wool."
iii. When wool is the chief object.

These subsections must be studied from a strictly economic aspect, and this brings forth the main issue, viz., climatic and pastoral conditions and situation to markets and transport. When establishing a farm flock, the breed or cross decided upon will depend on these factors. There is a very old and true saying, "Sheep for Districts," and unless this is strictly observed, sheep keeping on the farm cannot be conducted on truly economic lines. When considering the establishment of a flock, the State may be divided as follows:—

i. Good rainfall, heavy carrying pastures within reasonable distance of markets, and good transport. Cross-bred ewes to mate with British rams for fat lamb production.
ii. Moderate rainfall, good average pastures, within reasonable distance of markets and good transport. Merino ewes, to mate with British rams.
iii. Light rainfall, light pastures, long distances from market, and indifferent transport. Merino ewes, mated with Merino rams.

Cross-Breds.

It must be pointed out that sheep husbandry is to some extent influenced by personal inclination. For example, some men appear unable to interest themselves in cross-breds, while others prefer them, and although the division of the State as shown above is made on sound economic lines, some farmers may possibly obtain better results by modifying it to suit their "likes" and "dislikes."

This type of sheep is recommended for the good rainfall districts with heavy carrying pastures. First because these districts are particularly suited for fat lamb production, and cross-bred ewes are best for the purpose, being better mothers,

producing better percentages both in numbers and first grade lambs. Secondly because heavily grassed pastures are subject to internal parasites, foot-rot and other diseases, and while cross-breds are not immune to these troubles, they have a greater resistance than Merinos.

When establishing a cross-bred flock of ewes, there are two methods of procedure—

i. To breed them.

ii. To buy them.

The first essential is to decide on the cross which will be the most profitable. Climatic conditions have a bearing on this, because under very hot, dry conditions, some breeds are inclined to lose fertility, while others do not appear to suffer. Another point which must also be considered is "wool." In spite of the fact that the lamb is of the first importance, wool cannot altogether be disregarded. When all factors are considered, the choice must be for one of the long-woolled British breeds, and one has the Lincoln, English Leicester, Border Leicester, and Romney Marsh to choose from. The English Leicester is the best wool cutter when quality and fleece weight are considered. The Lincoln is very coarse, and the other two are not heavy wool producers.

The English Leicester cross-bred ewes are therefore recommended for Southern districts. In the hotter Northern districts, however, they appear to lose fertility, and the Border Leicester, which does not appear to suffer in this way, is recommended for Northern districts. The Border Leicester, although a lighter cutter than the English, has many excellent points, such as very early maturity, and can be used in any district suitable for cross-breds. Where the pastures are marshy and particularly subject to internal parasites, such as lung worm and fluke, then the Romney Marsh cross is the most resistant and consequently the best.

In a general way, it may be said, "English Leicester or Romney Marsh for the wet Southern districts and the Border Leicester for the drier ones."

When cross-breds are recommended for these districts, it should be clearly understood that reference is made to well bred, first cross ewes, and not the mongrel lines of so-called cross-breds, so often seen on Southern farms.

When establishing a flock of cross-breds by breeding, the first essential is to secure a straight line of well bred station ewes, culled for age. These are joined with a British long woolled ram, the ewe lambs kept for breeding, and the wether lambs sent to market. It is also advisable to cull the worst of the ewe lambs and send them to market. When the ewe lambs are old enough for breeding, they should be joined with a ram of one of the Down breeds, such as Southdown. There is one objection to establishing cross-bred ewes by breeding, and that is it means keeping two different breeds of rams on the farm, and there is always the danger that the Down ram may get with the Merino ewes. Should this happen, the ewe lambs of this cross should not be kept for breeding purposes.

Establishment by Purchase.

There are two serious objections to this method. First, really good first cross ewes are very expensive to buy, and secondly, independent of price, they are often unprocurable. A few breeders are now adopting the practice of breeding half-bred long wools, marketing the wether lambs and keeping the ewe lambs to sell as hoggets for breeding purposes. This is proving quite profitable, and no doubt, the practice will extend, and the objections cited will disappear.

Merino Ewes Mated with British Rams.

The moderate rainfall districts which constitute the best wheat growing areas of the State, are particularly suitable for wool growing, and the maintenance of the Merino. Therefore, the ewe flock should be Merino. There are different types of Merino, however, and it is of the utmost importance that the best or most suitable

type should be established, and this is the large plain-bodied, medium to strong woolled type. The chief points in favour of a Merino flock for these districts are:—

i. The climatic and pastoral conditions favour wool growing and are suitable for the Merino, and as they are the best wool cutters, they are the most economic proposition.

ii. This type of ewe may be bought in any numbers, at about a third of the cost of cross-breds.

iii. They cost less to keep than cross-breds, therefore more may be kept on a given area, and in this way the smaller lambing percentage that may be expected is to some extent compensated.

iv. The wool clip is even and can be easily graded for market, while the clip from cross-breds is always difficult to class.

v. The stations are to some extent dependent on the agricultural districts, as a market for their surplus stock. If farmers universally kept cross-breds, this market would be denied them, which would be a national loss.

Generally speaking, it is not an economic proposition for the farmer to breed his own ewes, because farm conditions are not altogether suitable for breeding the best type of Merinos. Further, the station manager is expert at breeding to type, and the farmer is not. When aged ewes are bought, they are proved breeders, and there is less risk of loss when mating them with British rams, than there is with young farm bred ewes. As the farm flock in these districts should be kept for the dual purpose of wool and lambs, it is practically impossible to breed both cross-bred and Merino lambs on the average sized farm.

Merino Ewes Mated with Merino Rams.

Light rainfall districts such as the outer wheat belt make cross-bred lamb raising out of the question. Yet these districts can and do maintain sheep profitably, in fact, the flock of sheep is perhaps of greater economic importance to farmers in these than in districts of surer rainfall. The first consideration must be wool, and it is imperative that the flock should be good wool producers, and their productivity maintained by careful management and breeding.

When establishing a Merino flock, a straight line of cull for age station ewes should be obtained when possible; failing this, and if the flock is below standard, it may be soon improved by culling and by the introduction of good flock rams.

Frequently in the outer wheat belt the holdings are only partly cleared, and the sheep are expected to live a part of the time in the scrub, and quite often the only fencing is a ring fence. Breeding cannot be successful under such conditions, and so a flock of Merino wethers would be best. When purchasing a flock, every effort should be made to secure a straight line, and an important factor is, do not keep a flock of wethers too long. Old wethers are difficult to fatten, and after a few years their wool production deteriorates.

Breeding.

For those who can finance it, it is a comparatively simple matter to establish a good flock, but to maintain a high standard is more difficult, chiefly because sheep are very prone to degenerate to original type. And if the ordinary every day principles of breeding are not observed, the standard of the flock will soon slip back.

Like Begets Like.

This principle means that in a general way it may be expected that the progeny will resemble their parents, allowing for a percentage of freaks and throwbacks which must always be anticipated. The principle has an important bearing on breeding, because it demonstrates how important it is to breed from high class animals. Misshapen rams and ewes may be expected to produce lambs of their own kind.

Blood Line Breeding.

The farmer breeder cannot go into line breeding to the extent of keeping family records, but he can practise it to the extent of buying his rams always from the same stud breeder, who breeds strictly on blood lines. This is a very important breeding principle, because it is the only way that a definite type can be established, and adhered to. The wide variation in type is one of the greatest disabilities of farm flocks.

Pedigree.

Pedigree is a record of ancestry, and it is especially important when breeding cross-bred lambs for export, because pedigreed animals will throw truer to type than mongrels. This means that a larger percentage of lambs will favour the pedigreed male parent in conformation, which is the type desired, and so a larger percentage of first class lambs may be expected when pedigreed rams are used. Stud rams cost more to begin with, but the extra money received for their progeny more than compensates for this.

Culling.

The almost total lack of culling by farmers is chiefly responsible for the low standard of quality in farm flocks. Sheep are particularly prone to revert to original type, and unless the degenerates are culled, even a good flock will soon become poor producers. This, of course, does not apply when the farmer buys cull for age Merino ewes, but those who breed to maintain a flock—and there are many such—culling is of paramount importance. It is absolutely essential when culling to work on definite lines or culling points and adhere to them. The chief culling points are:—

i. SIZE.—For farm purposes it is most important to have big sheep, because size denotes constitution, which is of primary importance in a farm flock. Size also gives a large area for wool. Large sheep in a general way are the heaviest wool cutters, and also mature earliest. Therefore, when culling, undersized animals should be rejected.

ii. CONFORMATION.—The Merino sheep are not symmetrical like the Southdown, but by judicious culling a reasonably square sheep may be produced. Therefore when culling, reject narrow chested, goose rumped, slab sided specimens. Conformation, like size, is also an indication of sound constitution.

Wrinkles.

Avoid body wrinkles in the farm flock, as they indicate sheep of poor constitution; and are particularly susceptible to fly attack. They do not fatten readily, and the wool on the wrinkles is uneven in length and quality. Practically every station breeder avoids them as unthrifty and poor type of sheep, and farmers should do likewise.

Wool.

It is important that the sheep should be well and evenly covered, with a profitable type of wool for farm purposes. A medium to strong type will be found the most profitable because it will stand severe farm conditions by retaining its character and fleece weight. An important point is character. By this is meant the natural crimp peculiar to Merino wool. Character is a sign of good breeding. Plainness and and hairiness are signs of degeneration. Another important point when culling for wool is to take particular note of the breech, because on this point the wool is very much inclined to become hairy or doggy, which is a serious fault, causing a great deal of comment from buyers, and means a reduction in values. Woolly heads are also undesirable. They are usually described as muffled.

When culling for wool, reject extra fine woolled sheep, also coarse straight fibred ones, and any that show hairiness of the breech, and also muffled headed sheep.

Time to Cull.

The best time to cull is when the young ewes are brought in for shearing, as they are then from 16 to 18 months old, and have a full fleece of wool, and if they have been well cared for, they will be well developed. The degenerates will stand out clearly, and culling will not be difficult. The best method is to run a few at a time into a small yard or pen, catch each sheep and examine it. Mark the culls on the nose with raddle, and when culling is finished, the flock may be shorn as one. A cull mark is any figure 2 to 9 put on the culls as well as the ordinary brand. The culls should then be put into a good paddock, fattened for sale or for ration sheep.

(To be continued.)

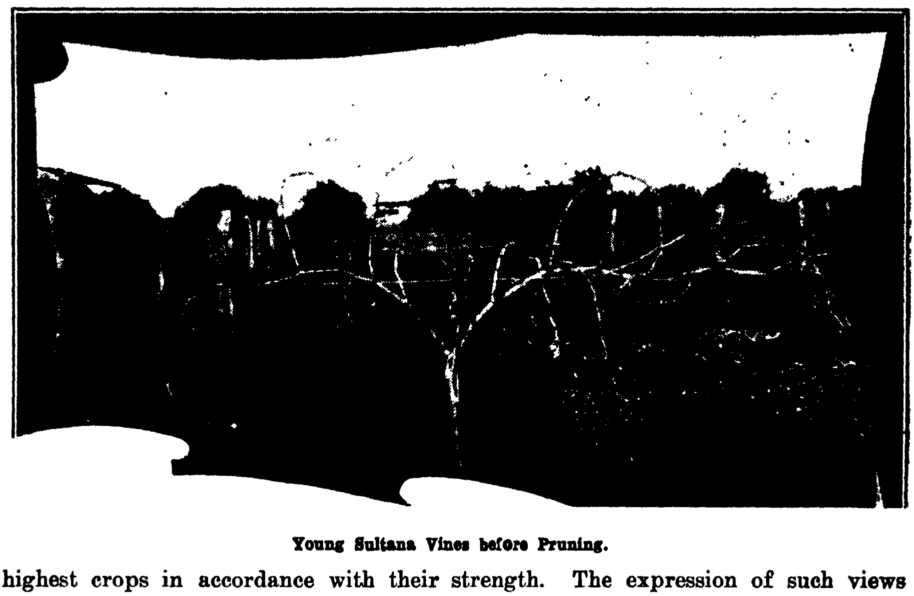
EXPERIMENTS IN THE PRUNING OF SULTANA VINES IN RELATION TO CROP RETURNS—RESULT OF SIX YEARS TRIALS AT BERRI.

[By N. S. FOTHERINGHAM, W. R. LEWIS, and F. R. ARNDT.]

[*A paper read at the Conference of River Murray Branches of the Agricultural Bureau held at Barmera on June* 22*nd,* 1934.]

The idea that in Pruning Competitions the crop as well as the actual pruning of the vines should be taken into consideration has for some time been the opinion of a number of sultana growers, who hold to the belief that the pruning of this vine has been based too much on theoretical standards without sufficient regard being paid as to how the methods used by pruners affect crop returns.

The statement has also been made at times that neatness and symmetry often appear to be the chief objective of many pruners at Pruning Competitions, and that the vines are not always pruned in a manner to enable them to produce the



Young Sultana Vines before Pruning.

highest crops in accordance with their strength. The expression of such views during recent years has led to some extent to greater uncertainty among sultana growers as to pruning methods, and has made it desirable that such ideas should be tested, so that the effect that pruning methods have on crop returns should be more clearly understood.

THE WILKSCH CUP.

The present pruning trials owe their inception to the initiative of Mr. P. M. Wilksch, of Berri, who offered portion of his vineyard for the purpose of holding a pruning competition under the auspices of the Berri Branch of the Agricultural Bureau, in which the pruners would be judged according to the total weight of fresh fruit produced during the three consecutive seasons of 1928-29, 1929-30, and 1930-31, but that the shape and general wellbeing of the vines at the end

of that period should also be taken into consideration by the judges in giving their award. The Berri Branch agreed to take charge of the competition, and appointed Messrs. N. S. Fotheringham, W. R. Lewis, and F. R. Arndt to act as judges.

It will be noticed that the original period laid down for the competition was three years. At the end of that period there was a dead-heat for first place, and on the recommendation of the judges the question of extending the competitions for another three years was agreed to by Mr. Wilksch, the donor of the cup and owner of the property, provided that the competitors were agreeable. With two exceptions the competitors agreed to the suggestion, and in consequence the trials were conducted for another three years, making six years in all.

Site of the Experiment.

The land chosen for the site of the experiment consisted of good, fertile, deep, sandy, red loam. The vines were in good heart—strong and vigorous—and had been well pruned and cared for. Each competitor was given a row of 46 vines to prune, and he pruned the same row every year. The nature of the soil and general condition of the vines was practically the same for each row. The vines all received the same treatment in regard to fertilisation, irrigation, and tillage operations, all of which work was performed by Mr. Wilksch.

Pruned Sultana Vine.

The Competitors.

The competitors who took part in the pruning trials for the first three years were:—Messrs. B. H. Jungfer, G. H. Bottrill, E. R. Moss, A. G. Jarvis, J. R. Johnson, W. N. Ellis, A. W. Magarey, and L. A. Chapple, but during the second three years Messrs. G. H. Bottrill and W. N. Ellis dropped out. The vineyard numbers of the rows selected for the pruning trials ranged from 11 to 18, and in this respect the competitors are referred to by the number of the vine rows they pruned.

Observations on Pruning Methods.

The judges attended the pruning trials each year and observed the methods used by the various pruners. The chief points upon which information was obtained included:—

1. The number of fruiting canes left by each pruner per vine per year.
2. The number of spurs left by each pruner per vine per year.
3. The system of pruning adopted by the various competitors.

4. The approximate average number of fruiting buds left by each competitor per vine from the 1930 pruning trials onwards. This was arrived at by counting the buds on 12 typically pruned vines in each competitor's row and averaged per vine, and the number so obtained was in each case used as the average number of buds per vine for each competitor.

WEIGHING THE FRUIT.

The fruit was weighed by Mr. Wilksch, who took every precaution to ensure that the weights were correctly taken. The following is the record of the weight of fresh fruit produced during the course of the experiments:—

TABLE I.—*Showing Weight in Pounds Yearly, Three-yearly, and Six-yearly for Each Competitor.*

No. of Competitor.	1929.	1930.	1931.	1929-1931.	1932.	1933.	1934.	1932-1934.	1929-1934.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
14	2,133	1,949	856	4,938	1,317	2,615	1,924	5,856	10,794
18	2,083	1,799	723	4,605	1,872	2,457	1,843	6,172	10,777
11	2,178	1,957	803	4,938	1,419	2,355	1,672	5,446	10,384
15	1,995	1,756	685	4,436	1,380	2,766	1,615	5,761	10,197
13	1,839	1,773	772	4,384	1,482	2,482	1,703	5,667	10,051
17	1,703	1,532	668	3,903	1,504	2,114	1,612	5,230	9,133
12	1,683	1,823	643	4,149	Withdrawn				
16	2,215	1,804	782	4,801	Withdrawn				

From the above table it will be observed that Competitor No. 14 (Mr. A. G. Jarvis) headed the list, with No. 18 (Mr. L. A. Chapple) next. The difference between these two competitors was 17lbs. of fresh fruit in six years.

EQUIVALENT ANNUAL AVERAGE WEIGHT OF DRIED FRUIT PER ACRE.

Worked out on an acreage basis, the average annual crop of dried fruit for each competitor for the six years, if calculated at the ratio of 3⅝lbs. of fresh fruit to 1lb. of dried, would represent the following weight in pounds for each of the three-year periods as well as for the full term of the experiment.

TABLE II.—*Showing Equivalent Average Annual Weight of Dried Fruit Per Acre in Pounds.*

Competitors—	11.	13.	14.	15.	17.	18.
Years.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1929-31	4,831	4,289	4,831	4,339	3,868	4,505
1932-34	5,328	5,544	5,729	5,636	5,116	6,038
1929 34	5,079	4,916	5,280	4,987	4,492	5,271

From this table it will be seen that the lowest average yield of dried fruit per acre for the six-year period was 2 tons and 12lbs. per acre, and the highest 2 tons 5cwts. and 40lbs. per acre. This shows that the pruning was good commercial pruning, as all growers would like to average a 2-ton crop for six years.

The relation of the number of fruiting canes left on the vines to the total weight of fresh fruit obtained by each competitor is shown in the following table.

TABLE III.—*Relation of Number of Fruiting Canes to Yield.*

No. of Competitor.	Total Fruiting Canes.			Total Weight Fresh Fruit.			Order of Competitor in Relation to Crop Yields.			Order of Competitor in Relation to No. of Fruiting Canes.		
	1929-31.	1932-34.	1929-34.	1929-31.	1932-34.	1929-34.	1929-31.	1932-34.	1929-34.	1929-31.	1932-34.	1929-34.
				lbs.	lbs.	lbs.						
14	991	1,229	2,220	4,938	5,856	10,794	1	2	1	2	1	1
18	844	858	1,702	4,605	6,172	10,777	3	1	2	3	5	4
11	1,007	911	1,918	4,938	5,446	10,384	1	5	3	1	3	2
15	785	918	1,703	4,436	5,761	10,197	4	3	4	4	2	3
13	695	770	1,465	4,384	5,667	10,051	5	4	5	6	6	6
17	774	888	1,662	3,903	5,230	9,133	6	6	6	5	4	5

A record of the number of fruiting canes left by each competitor at each pruning was taken in order to ascertain if any definite relationship could be established between the number of canes and the crops secured. At the end of the six-year trials, however, very little information that could serve as a guide to pruning practice was obtained from these records, for although the competitor who secured the greatest weight of fresh fruit (No. 14) also left the greatest number of canes on his vines; the competitor second on the list in regard to weight of fruit (No. 18), who was only 17lbs. behind the first competitor in respect to fruit returns, was fourth on the list so far as the number of canes left on the vines was concerned, while the results obtained by the other competitors showed but little connection between the ratio of canes to fruit for the six-year period of the experiment.

RELATION OF NUMBER OF BUDS ON CANES TO FRUIT YIELD.

As it was realised that the relationship between the number of fruiting canes and vine yields could be approximate only—as the fruiting rods, being of various lengths, could not all be of equal value for fruiting purposes—it was considered that the number of buds left on the fruiting canes would probably give a more accurate ratio to crop returns than that given by the number of fruiting rods only.

Accordingly, as previously stated, from the 1930-31 season onwards, the buds on a number of typically pruned vines of each competitor were counted and averaged per vine, and the numbers so obtained were used as the average number of buds per vine for each competitor. The relation of buds to fruit yields is shown in the following table for the four years during which these records were taken.

TABLE IV.—*Relation of Number of Buds on Canes to Fruit Yields.*

No. of Competitor.	App. Average Buds per Vine.			Total Wt. Fresh Fruit, 46 Vines.			Average Wt. Fresh Fruit per Bud in lbs.			Order of Comp. in relation to Yields.			Order of Competitor in relation to No. of Buds.		
	31	32–34	31–34	31	32-34	31-34	31	32-34	29-34	31	32–34	29–34	31	32–34	29–34
				lbs.	lbs.	lbs.	lbs.	lbs.	lbs.						
18	63	73	72	723	6,172	6,895	·2494	·6127	·5205	4	1	1	4	4	5
14	90	101	99	856	5,856	6,712	·2067	·4202	·3685	1	2	2	1	1	1
15	58	78	75	685	5,761	6,446	·2567	·5352	·4671	5	3	3	5	3	3
13	64	73	72	772	5,667	6,439	·2622	·5625	·4860	3	4	4	3	5	4
11	81	79	80	803	5,446	6,249	·2155	·4995	·4245	2	5	5	2	2	2
17	53	72	69	668	5,230	5 898	·2739	·5264	·4646	6	6	6	6	6	6

During the 1930-31 season, which was the first year that the relationship of buds to yield was investigated, the results showed that the six highest competitors of the eight pruners then in the competition obtained fruit yields in the same order as the number of fruiting buds left on the vines. During the following

C

three years, however, this [illegible]irely changed, and for the four-year period during which these records were taken the results showed no definite relationship between the number of buds and fruit yields:—Thus, Competitor No. 18, who secured the largest crop returns for this period was fifth in order of the number of buds left on the vines, while No. 14, who was second in order of fruit yield left more buds on his vines than any of the other competitors.

It would appear, therefore, that the buds left on the vines by the various competitors were not all of equal value for fruiting purposes, and that it is the quality of the buds rather than their number that is the chief factor in fruit production.

Comparison of Yields Between First and Second Three-year Periods.

The following table which shows the comparison between the yields of the first and second three-year periods is of interest as showing the difference of yield obtained by the various competitors during these periods:—

Table V.—*Comparison Between Yields in Pounds During First and Second Three-year Periods.*

Competitor No.	14.	11.	18.	15.	13.	17.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1932-34	5,856	5,446	6,172	5,761	5,667	5,230
1929-31	4,938	4,938	4,605	4,436	4,384	3,903
Increase. 1932-34	918	508	1,567	1,325	1,283	1,327

The chief feature to be noted from the above table is that Competitors Nos. 14 and 11, who tied for first place in the first three-year period, have had during the second three years much less gain in fruit than any of the other competitors. Both these latter competitors had left considerably more rods and spurs on their vines than any of the other pruners for the first three years. It would appear, therefore, that their vines were more overtaxed during that period than those of the other competitors.

Referring back to Table III.—Showing the Number of Fruiting Canes in Relation to Yield—it is seen that Competitors Nos. 15, 13, and 17 considerably increased their canes during the second three-year period, whereas No. 18 increased his by only 14 canes. This would lead one to believe that the three above-mentioned competitors had given their vines too little to do in the first three-year period, and knowing the results of the first three years' trials had increased the number of canes and spurs per vine during the second three years of the competition. No. 18, however, although increasing the number of his canes only slightly, increased the average number of buds per vine from 63 to 73, which is almost equivalent to another cane.

From this it would appear that the vines of Competitors Nos. 13, 15, 17, and 18, on account of lighter fruiting, were in first-class condition at the beginning of the second three-year period, which enabled them to respond with larger yields when given more to do, whereas the vines of Competitors Nos. 11 and 14, having been more heavily taxed during the first three years, were not sufficiently strong to give the same increase during the second three years as the other vines.

The Present Condition of the Vines.

On examining the vines this winter after the leaves had fallen the first thing noticed was that the vines that had produced the greatest yield during the first

three years of the trials, that is, those pruned ...rs Nos. 11 and 14, were weak in places, and were not in so good a c..dition in re. lation to shape and position of fruiting wood as were the others.

Thus No. 11 had a considerable proportion of the fruiting w ood of the vines pruned by him well out from the centre of the vines, while s everal vines were in weak condition, probably on account of having been given too much to do.

No. 14 secured the greatest weight of fruit for the term of the competition, although in most cases having good fruiting wood, much of this was well away from the centre of the vines. This competitor pr ned on the system of depressing the fruiting canes, but the trellis was not ver y suitable for this class of pruning. On a number of vines there were as many as five to six secondary arms, and in most cases there was very little new growt h near the centres of the vines, so that to get suitable fruiting wood at present it would often be necessary to go out several feet from the crown of the vine. A s the fruiting wood was getting farther out every year it would be necessary to re move much of the surplus outer growth to get the vines into good shape again.

Competitors Nos. 13, 15, and 17.—The vines prune d by these competitors were generally of fairly good shape, with fruiting wood reasonably close to the centres of the vines, making them comparatively easy to prune during the present

Vineyard of Trellised Sultana Vines after winter pruning.

winter. These vines generally did not appear to have been depleted in strength on account of excessive fruiting, and should be capable of continuing to bear good average crops.

Competitor No. 18.—The vines pruned by this competitor were in good heart and of good shape, there being an abundance of good, bold fruiting canes on the vines in good positions, with sufficient new growth near the centres of the vines to which to prune back to if necessary. These vines generally were in a better state than those of any of the other competitors, and owing to their good shape would present no difficulties in pruning this winter. By the appearance of these vines there was no suggestion that their strength had been overtaxed during the period covered by the competition, and as there was an ample supply of good fruiting wood to select from situated in good positions on the vines, there was every indication to suggest that they were capable of continuing to produce heavy crops during the coming years.

Conclusions Reached as Result of Competition.

The final conclusions that may be deducted from these competitions are not of the same nature as would have been the case had these trials been discontinued after three years. At the end of that period the records showed that the crop

returns were in propo... work that the vines had been given to do, and that the order of crop produ...n during the third year was in six cases out of eight in proportion to the number of buds left on the fruiting canes of the vines.

During the following three years this ratio of fruiting wood to crop production was not maintained, for although four of the competitors increased their crops by giving their vines more to do, their yields were neither in proportion to the buds nor to the fruiting canes left on the vines. The records of the whole six-year series of experiments gave similar results to those obtained during the second three-year period, and showed that no definite rule could be laid down as to the exact number of buds or fruiting canes that should be left on the vines to secure the best crop returns over a number of years.

What conclusions, then, may be reached from the results of these experiments that would serve as a guide to pruning practice? Although these records show that no hard and fast rule can be deducted for the pruner's guidance, there are, nevertheless, certain aspects of good pruning practice that these trials have

Well-grown Sulta... Vine with Fruit.

emphasised, and which have to be intelligently applied if satisfactory results are to be obtained over a number of years. The chief of these pruning essentials may be briefly summed up as follows:—

1. In the first place it should be realised that the vine is a living thing that must not be abused if it is to produce its best. It must not be given too much fruiting wood to carry, and at pruning time must be carefully treated and not injured by making big saw cuts on the main arms of the vines, as is often done, which restricts the sap flow and weakens the vitality of the vine.

2. That the fruiting wood left on the vine should be proportionate to its strength. From this it follows that as no two vines are exactly of the same strength the pruning treatment must vary with each vine.

3. That the object of good pruning practice should be to strike the correct balance between growth and fruit; too drastic pruning will give growth at the expense of fruit, while the leaving of too much fruiting wood gives fruit at the expense of growth, and so weakens the vine for future production.

4. That a smaller number of good strong fruiting canes with well-developed buds should be left in preference to a greater number of weaker canes with smaller buds. The results of the pruning trials showed that the buds and canes left by the various pruners were not all of equal value for fruiting purposes, and that it was the quality of the fruiting wood rather than its quantity that gave the best results.

5. That on well-developed vines that have been well cared for, as those utilised in these pruning trials, six good strong fruiting canes carrying, about 72 well-developed buds, are sufficient to enable the vines to carry a 2-ton crop of dried fruit for a six-year period without depleting their vitality, and that on such vines the laying down of more fruiting wood was not desirable, either in regard to crop production or in respect to the vigour of the vines. This relationship of fruiting wood to yield and vine vigour was probably the most important feature brought out by this series of experiments, a knowledge of which should be of value as an aid to future pruning practice.

The Winner of the Wilksch Cup.

As previously mentioned, this cup was offered by Mr. P. M. Wilksch as a prize for the winner of the pruning competition in which the pruners were to be judged according to the total weight of fresh fruit produced by their vines during the term of the trials, but that at the end of that period the shape and general well being of the vines should also be taken into consideration by the judges in giving their award.

The general condition of the vines pruned by the various competitors at the end of the trials has already been described. Of the various competitors there were practically only two in the running at the end of the six-year period, namely, Nos. 14 and 18, and of these the former had secured 17lbs. more of fresh fruit than the latter.

On examining the condition of the vines, however, it was at once apparent that those pruned by No. 18 were in far the better condition, both in regard to shape and position of fruiting wood, while those of No. 14 were in a much less satisfactory state, having fruiting canes in many cases far from the centres of the vines.

Therefore, as there was only a difference of 17lbs. of fresh fruit in six years between the two competitors, and as the vines pruned by No. 18 were in much better condition than those of No. 14, thereby making them much less costly to prune, which would much more than compensate for their slightly lighter yield, the judges decided to award the cup to Competitor No. 18, Mr. L. A. Chapple.

VETERINARY INSTRUCTORS.

In July, 1934, a deputation consisting of members of the Advisory Board of Agriculture, supplementing a deputation of the same Board in May, 1933, waited on the Hon. Minister of Agriculture with reference to the requests of Branches of the Agricultural Bureau seeking the appointment of Veterinary Instructors in country districts. The deputation made the following statement:—

During the past two years, resolutions have been carried at nine Conferences of the Agricultural Bureau in various parts of the State, asking for Veterinary assistance for country districts. These resolutions, together with numerous inquiries for Veterinary lectures and demonstrations, are regarded by the Advisory Board of Agriculture as definite indications that farmers of South Australia feel the need of adequate instruction in the principles of stock management in health and disease.

A committee appointed by the Board gave careful consideration to the persistent requests of Conferences and Branches, and after looking into the matter from the point of view of practices adopted elsewhere and of the value and the mortality of livestock in this State, made the following recommendation:—

"That your Committee, having carefully considered the question of Veterinary Services for country districts, recommends that in view of the importance of the livestock industry to this State, and on account of the yearly mortality among livestock, the Veterinary staff be strengthened, and a Veterinary officer be stationed at each of the following districts:—

1. Central (Adelaide).
2. South-East (say, at Naracoorte).
3. Murray Mallee (Loxton or Lameroo).
4. Eyre's Peninsula (Yaninee or Minnipa).
5. Northern (Port Augusta or Wilmington).

The staff would be under the control of the Chief Inspector of Stock in Adelaide.

The Committee believes that the duties of the country Veterinary Surgeons should be to supervise the livestock of their districts, and to that end they should travel about their districts over a defined itinerary. They should give advice and, if possible, practise as Veterinary Surgeons when required. For such Veterinary work they should make a revenue charge on the basis of a fixed scale, it being understood that no charge for mileage shall be imposed upon those requiring their services."

The Committee attached to its recommendation a statement showing the value of the livestock industry and the yearly mortality of stock in this State.

The Advisory Board endorsed the recommendation of the Committee, and appointed a deputation to wait on the Hon. Minister with the hope that action would be taken to give effect to the proposal.

The matter was referred to the Chief Inspector of Stock, who reported as follows:—

The Committee appointed by the Advisory Board refers to the fact that at nine Agricultural Bureau Conferences resolutions have been carried asking for veterinary assistance in country districts. These requests are obviously due to the fact that there are no qualified Veterinary Surgeons in private practice in the country districts of this State. This Department has, wherever possible, made its professional staff available to assist country stockowners, and it would appear that this has given rise to the impression that it is one of the functions of the Stock and Brands Department to provide veterinary attendance for all cases of sickness and injury in farm animals.

The absence of qualified Veterinary Surgeons in country districts is due to a number of causes, among which may be stated the inability of South Australian students to qualify in Veterinary Science within the State, and that in South Aus-

tralia there is no legislation for the registration of Veterinary Surgeons and for the control of the practice of veterinary surgery. It is nevertheless the fact, however, that notwithstanding these disabilities, there are few country districts within the State in which a qualified Veterinary Surgeon could not be induced to practise his profession if an organised effort was made by the stockowners themselves by means of a guarantee, by the establishment of a veterinary lodge, or by other means.

I am of the opinion that the provision of veterinary services by the Government should be for the control of contagious stock diseases, the investigation of serious outbreaks of disease in animals, and for veterinary research. It would be of more value to the State if the Department could be extended for these purposes than for the practice of Veterinary Surgery, which is the province of the private practitioner.

I am of the opinion, therefore, that the requirements of the State in the above respects should be fully supplied before any consideration is given to an extension of the activities of the Department in the manner suggested.

It is strongly recommended, however, that any steps which can be taken for the encouragement of private practice should be adopted, and legislation for the registration of Veterinary Surgeons and the establishment of veterinary scholarships by the Government will materially assist in this direction."

The Minister has informed the Board that he agrees with the opinion expressed by the Chief Inspector of Stock.

THE EFFECT OF ARSENIC—AS USED IN POISONING GRASSHOPPERS—UPON BIRDS.

[Review of Bulletin No. 218, published by the Oklahoma, U.S.A., Agricultural Experimental Station.]

The author reviews the literature dealing with the possibility of domestic and wild birds being poisoned by feeding on bran baits used in control of grasshoppers or on the poisoned grasshoppers themselves. In Oklahoma, domestic fowls and quail confined without food for 24 hours and then supplied with bran poisoned with 4 per cent. white arsenic (As_2O_3), which was scattered about the pens at the rate of 100lbs. per acre, showed no indications of poisoning after 24 hours. When poisoned bran was forcibly administered, 74 mg. As_2O_3 proved slightly toxic to a 22oz. fowl (*i.e.*, 3.363 mg. per oz. of bird weight).

When individual grasshoppers were caged with bran flakes of selected standard size, each weighing approximately 2.337 mg. and containing 0.0935 mg. As_2O_3, the number eaten by one adult of three species averaged 8.05, 3.02, and 3.2 respectively. The reliability of these tests in indicating the arensic content of poisoned grasshoppers was confirmed by analysis of 72 poisoned adults of *M. bivittatus*, which were found to contain an average of 0.75mg. As_2O_3.

From a series of experiments in which 144 birds of various species were fed on grasshoppers, the following conclusions were drawn:—Fowls discriminate between poisoned and unpoisoned grasshoppers, and eat less than half as many of the former; the amount of arsenic consumed by them in eating only poisoned grasshoppers averages less than half the toxic dose, and their weight and growth after 66 days is not materially affected; quail eating a normal number of grasshoppers would, if the latter were poisoned, receive only from 1 to 7 per cent. of a toxic dose of arsenic; there is practically no danger to adult wild birds from eating poisoned grasshoppers, though there may be slight danger to nestlings. Chemical analysis of the bodies of fowls that had eaten many poisoned grasshoppers showed that they could safely be used for human consumption.

COKE POT AND FAN METHOD OF DRYING CURRANTS.

[By H. H. ORCHARD, R.D.A., Horticultural Instructor.]

Some four years ago, Mr. A. H. Howard, of Langhorne's Creek, experienced damp weather conditions soon after spreading his currants on the racks. The grapes quickly reached a state that, under ordinary conditions, there was no chance of obtaining a satisfactory dried article, and unless something was done, and at once, a dead loss of anything up to £300 confronted him.

From this forced situation, he evolved the coke pot and fan method of finishing off his currants, a method which was originally tried out by Mr. W. Cooper, sen., of McLaren Flat, some twelve years ago, but not persevered with. The idea is very simple, and, briefly, consists of enclosing the drying shed with galvanised iron along sides and ends, and then circulating hot air through the racks by means of coke fires and fans.

Naturally, methods were crude at first, but on the basis of experience gained during the intervening seasons, improvements have been made; it is not claimed, however, that perfection has yet been attained. The method is still in the experimental stage, and success largely rests with the grower himself, and his ability to apply common sense. The only claim made is that it is a simple and cheap method of dehydrating currants in a minimum of time. Whilst admittedly mistakes have been made in the past, no fruit has been spoilt under this system, and last season approximately 46 tons were dried.

Mr. W. C. Cooper, of McLaren Flat, is another grower who favours the system after three years' trial.

The main essential is a suitable drying shed, and without this a grower may easily be disappointed with the result. The galvanized iron roof should be curved; the hip roof is not satisfactory. The sheds used comprise double sets of racks, each set 6ft. wide and 56ft. long, divided into bays of 7ft., and with a 7ft. race. Each set of racks contains 14, placed about 6in. apart. The sheds hold 7 to 8 tons of fruit.

Galvanized iron is used to enclose the shed, and should be fastened so that it will withstand the rapid circulation of air created by the fans; clamping, for instance. Hessian is not at all suitable for this purpose. The ingress of cool air must be prevented as much as possible, but at the same time, the shed must not be absolutely air-tight, and therefore should operate in calm weather, if possible. The floor of the shed requires attention to minimise dust, and whilst straw can be used immediately under the racks if reasonable care is exercised, it will possibly be found necessary to brick or cement the centre.

One-inch water piping is used to carry the fans; if of smaller diameter the threads will gradually become stripped. This piping runs down the centre the full length of the shed, overlapping at each end, and is placed not higher than 6ft. from the floor. To carry this piping, 3in. x 2in. timbers 7ft. 6in. long are placed at intervals, and fastened to the shed or rack uprights. In the centre of these cross pieces are two smaller pieces of timber, the lower one attached, and the higher one clamped, and each grooved, so that when clamped tightly together a circle sufficient to take the piping is formed.

Double fans, that is, one either side of the shafting or piping, are fixed, generally one for each bay or not more than 7ft. apart. The fans vary in construction amongst the growers, but due regard must be given to stability, area in which they are to operate, and that they work reasonably close to the coke

pots. One type was made of 24-gauge iron, 18in. square, rivetted to 1¼in. by ⅛in. iron, which was in turn clamped by means of a collar to the piping. The overall length of this fan from centre of piping to edge of fan was about 24in. Directly under each fan is placed a coke pot. These pots are 40gall. petrol or bitumen drums cut in halves; the former are preferred because of their greater strength. Holes are made in the bottom and side near the bottom, and to each are attached two wire handles for carrying. A pulley is placed towards the end of the piping, and by means of a belt operating from an engine the fans are revolved, and it is estimated that upwards of 150 revolutions per minute should be sufficient. Mr. Howard uses his Fordson tractor for the purpose, but a 3h.p. engine should be quite suitable for a shed of the dimensions stated. The advantage of a tractor is that it can readily be shifted to the other end of the shed if required, and so reverse the movements of the fans. Naturally, both movements cannot be obtained from the one end, as the pipe length will unthread, and a pin through the thread is not permanently effective.

The coke pots must be started outside; and the whole of the kindling wood thoroughly burnt out before being placed in the shed. This point must be closely observed, as otherwise fruit will be affected. Wood must not be used in the pots in the shed. For the first three hours the temperature should be kept down, and after that never at any time allowed to get over 130° F. Should the temperature become too high, place the covers ready for the purpose on the pots. In handling the coke, a good plan is to have a large case (an old piano crate will do) filled with coke and wetted down, and then add this as required to pots. The damp coke when added to the fire appears to form a crust on the surface, obviating the risk of coke dust which otherwise would settle on the top trays.

It is not possible to estimate actual costs, as no definite figures have been kept. The city price of coke is 38s. per ton, and there are about 33 bags to the ton. Mr. Cooper last year used 10 to 12 bags a day, and approximately 3 tons for the season. He finished off one lot of 7 tons of currants in 60 hours, which he estimated a portable dehydrator would have taken seven days to do.

Currants should be a little on the dry side when the heat is removed, as they invariably come back a little. Thorough mixing is also necessary when removing from the racks.

The whole of the equipment required need only be of a temporary nature, and could, if necessary, be used for other purposes during the rest of the year.

Apart from the simplicity and economy in working, probably the greatest claim for the coke pot and fan system of dehydrating currants is that fruit once on the racks is not again handled—as in the case with dehydrators—until ready to come off.

Rough handling at any stage of drying can very easily reduce the fruit one crown, and this loss would be additional to the charge of £3 per ton for dehydrating.

It is again stated, in conclusion, that the method is still in the experimental stage, and at present success largely rests on the ability of the grower to recognise and correct faults. The growers mentioned, who have profited from their experiences, are of the opinion that the method is advantageous, it is simple to construct, economical to run, saves considerable time, and correctly handled no damage to the fruit results either in appearance or keeping qualities.

There seems, however, one factor that requires further consideration, and that is the movement of the fan—whether the present rotating method is superior to a pendulum motion or to the horizontal position.

PURE CULTURED YEASTS.

[By A. R. BECKWITH, R.D.A. (Oenology Cadet, Roseworthy Agricultural College), now employed by Penfolds Wines Ltd.]

[This paper outlines the results of an investigation conducted at the Roseworthy Agricultural College, South Australia, to determine the advantages or otherwise of using pure cultures for the manufacture of Australian wines.]

The importance of pure cultured yeasts in the manufacture of wine has long been recognised, and it is a known fact that large variations in the quality of the finished wine can be brought about by the use of different yeasts, at vintage. This is due to variations in the amounts of by-products formed during fermentation.

Apart from differences in the quality of the wine produced by various yeasts, another factor to be considered is the quality of the must. A poor must could not be turned into a high-class wine by use of one special yeast, but a high-class must could be made into a high-class wine with a suitable yeast, or only an average wine by one of inferior fermenting powers.

It is the general practice of many of the larger wineries to import fresh cultures of yeast from the Continent every year or two. There is some difference of opinion as to whether a local yeast should be selected and cultivated, or whether an imported yeast known to give good results should be used. It is quite probable that the local yeasts may prove unsuitable for fermentation when vines are introduced into a new district, and in this instance it would be of advantage to introduce a yeast which has proved itself. Even now, the importance of the yeast supply is not fully appreciated, and with the use of tested and selected strains, improvements in the fermentation and the finished product would be brought about.

In many cases, the natural yeasts which adhere to the skins of the grapes are allowed to ferment the must, sometimes with good results, but more often with results which do not compare favourably with those obtained from a known yeast. The habits of a pure, selected yeast become known to the wine maker, and to some extent the type of fermentation can be anticipated; this knowledge is very useful in a winery at the rush period of vintage. Besides, with normal vintage practices and precautions, a clean fermentation is assured.

The variations in the amount of alcohol produced by different yeasts from a given amount of sugar are also of practical interest, especially in the manufacture of fortified wines. This has a bearing on the amount of fortifying spirit to be added, and, incidentally, the cost of the wine.

To demonstrate the influence of different yeasts, eight types were collected from various wineries in South Australia. The yeasts originally came from some of the main wine-producing countries of the world, and include types from France, Germany, Portugal and Algeria, and four Australian types (Magill, Barossa and Roseworthy).

The yeasts, when received, were immediately cultured on a solid medium until required. They can be so stored on such medium for a long time, and culturing them in this way is a suitable means of carrying them over from one vintage to another. In one case, a local yeast was stored on an agar slope in a dry place for nearly 12 months. The agar dried out hard, but the yeast was still alive, and conducted a normal fermentation when placed in a flask of sterile must.

METHOD OF CULTURING.

For culturing the yeasts, solid agar nutrient medium (modified Lorenz standard) was used. This contained ammonium sulphate, magnesium sulphate potassium phosphate, tartaric acid, glucose, agar and water, thus supplying the necessary food requirements and at the same time being sufficiently acid to suit the yeast. To prepare the mixture it is melted and dissolved in the autoclave, which, incidentally, affects sterilisation. After filtering through cotton wool, it is kept in a flask plugged with cotton wool. When required, it is melted in the Koch steamer, and about 10 ccs. of the hot liquid poured into petri dishes (previously sterilised), and allowed to set.

When the agar is inoculated with the yeast, giant colonies appear on the surface after a day or two; and the object is to assure that each colony arises from a single yeast cell. When "seeding" the plates it is necessary to dilute the fermenting must, so that a drop in a platinum loop contains about 10 cells (otherwise the concentration of cells will be too great). This is accomplished by making several dilutions with sterile distilled water as follows:—

(*a*) Three drops of must in full fermentation are added to 15 cc. of sterile distilled water, in a sterile test tube and thoroughly shaken.

(*b*) Three drops of (*a*) are added to 15 cc. of sterile distilled water and shaken.

(*c*) Three drops of (*b*) are added to 15 cc. of sterile distilled water and shaken.

A drop of the liquid from tube (*c*) normally will contain approximately the right concentration of cells for inoculating the agar plate with the platinum loop.

To guard against mould infection, a metal hood was used to cover the plates while operating. This was easily sterilised by heat.

The yeast was grown on the agar in the form of stripe surface cultures. The platinum loop was sterilised by heat, and dipped into tube (*c*) of the yeast solution, and drawn over the surface of the agar. About five stripes were made on each plate, and these were placed in the incubator at 25° C. (77° F.). This temperature is suitable for the growth of yeast, and the first signs of growth on the agar were apparent after 20 to 24 hours.

The next process consists of subculturing to be certain that the culture is absolutely pure. This is carried out as follows:—One colony, typical of the type under examination, is selected, and transferred to a test tube of sterile distilled water by means of the platinum loop. Dilutions are made as above, and another plate inoculated with the cells from the single colony. These cells again produce colonies on the agar, and when fully grown are stored in a cool place or transferred to sterile must for fermentation. These colonies should therefore represent a pure culture, as they have been derived from a single yeast cell.

THE YEASTS.

1. *Local Muscat.*—From 1932 Muscat, Roseworthy College.
2. *Local Shiraz.*—From 1933 Shiraz, Roseworthy College.
3. *Rioja Tempranillo.*—From Geisenheim University, Germany.
4. *Vezenay.*—From the Institute Zymotechnique, France. Suitable for light and delicate types of wine.
5. *Port Type.*—From Portugal, through the Institute Zymotechnique. Suitable for sweet wines; vigorous fermentation and rapid rise in temperature.
6. *Dorrien High Strength.*—From a vat of wine, 33 per cent. P.S., which showed active yeast and which had no difficulty in fermenting sterile grape juice. 1933 vintage.
7. *Magill.*
8. *Algerian.*—The optimum temperature of fermentation with this yeast is said to be about 40° C.

GENERAL OUTLINE OF METHOD.

Duplicate flasks of sterile must were fermented by each yeast, and the following determinations were made, in duplicate, on the wine obtained in each flask:—Alcohol, glycerine, unfermented sugar, total and volatile acids.

THE MUST.

Muscat juice which had been pasteurised and stored in bottles. Sulphur dioxide was not used in its preparation.

TREATMENT.

About 10 litres of must were blended in a stone jar, and sterilised by steaming in the autoclave at 100° C., with two heatings, totalling six hours. Ammonium phosphate was added at the rate of 4ozs. per 100galls., and tartaric acid, 1 gram per litre. This must was then siphoned while hot into sterile flasks and plugged.

The yeasts were transferred from the agar plates to small flasks of similar must and allowed to ferment vigorously. When in full fermentation, 10 cc. of must were added to each of the test flasks.

THE FERMENTATION.

Vigorous fermentations were in progress at the end of 21 hours, and observations were taken on them as they proceeded, but nothing outstanding was noticed.

At no time did the temperature of the fermenting must exceed the room temperature by more than 1° C. The temperature was ideal for fermentation, and was maintained between 20° and 25° C. for most of the time, but at the end of the fermentation the temperature exceeded this by a few degrees.

SYSTEM OF TESTING.

Eight yeasts were employed, and for each yeast there were two separate fermentations, which were carried out in 1 litre Erlenmeyer flasks plugged with cotton wool. Upon each flask duplicate chemical tests were conducted, thus making four separate analyses for each type of yeast. In the case of alcohol, duplicate distillations were carried out for each flask, with at least two weighings for the specific gravity of each distillate.

By using the duplicate system a check was kept on all analyses.

THE ANALYSES.

After fermentation was complete, and the lees had settled, all samples were filtered brilliant with the aid of a small gauze-plup filter.

For each wine the following tests were conducted:—Alcohol, glycerine, unfermented sugar, total and volatile acids.

The alcohol was determined from the specific gravity of the distillate at 20° C./4° C. in vacuo, by weighing in a Sprengel tube, and adopting the method of the Association of Official Agricultural Chemists.

Unfermented sugar was determined gravimetrically by reducing the copper sulphate of Fehling's solution to cuprous oxide and igniting this and weighing as cupric oxide. (Leach, "Food Inspection and Analysis.")

Glycerine was extracted with alcohol and ether then weighed (A.O.A.C. method.)

Total acids were titrated with 0.13 N. sodium hydroxide, using phenolphthalein as an indicator.

Volatile acids were determined with the Sellier distillation tube, and titration with 0.1 N. sodium hydroxide, using phenolphthalein as the indicator (A.O.A.C. method). There were no corrections for sulphur dioxide, as none was added to the must.

ALCOHOL.

Ethyl alcohol, the most important product of fermentation, is the one of greatest interest to wine makers. Its formation from grape sugar is represented simply by the equation

$$C_6H_{12}O_6 - 2C_2H_5OH + 2CO_2$$

Grape sugar — Ethyl alcohol + Carbon dioxide.
but in reality it is not as simple as this.

It is a complex action, brought about by the enzyme, zymase, and closely associated with phosphates. With reference to the part played by phosphates in the fermentation process, there is considerable difference of opinion.

If the action were as simple as the above equation indicates we could expect to obtain a theoretical maximum of 51.10 grammes of alcohol for every 100 grammes of sugar present in the must.

In practice the yield falls far below this, and in attempting to ascertain greater details of the process, the following observations require consideration:—

1. Consumption of sugar by yeast.
2. Some sugar remains unfermented.
3. Besides ethyl alcohol, other by-products are formed from the sugar.

These factors will be dealt with individually. The large number of by-products formed, and the large variation in the quantities produced, particularly ethyl alcohol, make it easy to understand why one yeast should be superior to another from the wine maker's point of view.

The following figures show the variations in alcohol produced by the eight yeasts, from a must containing 22.26 grammes of dextrose per 100 cc., about 12.5 degrees B.—

	Alcohol.	
	% Vol.	% Proof.
Magill	12.79	22.38
Algerian	12.74	22.29
Dorrien H. S.	12.68	22.19
Port type	12.64	22.12
Vezenay	12.58	22.02
Rioja Tempranillo	12.56	21.98
Local Muscat	12.30	21.53
Local Shiraz	12.18	21.32

The two latter yeasts, viz., local Muscat and local Shiraz, may be considered as natural yeasts derived from the skins of the grapes, while the other six have been selected and used by various wine makers of this State to conduct their fermentations. Taking these figures into account, it will be seen that the selected yeasts are definitely superior as far as alcohol production is concerned.

The following table is prepared from the above figures. This shows the amount of sugar necessary in the must to produce 1% of alcohol by volume:—

Grammes of Sugar Necessary to Produce 1% Alcohol (Vol.)

Magill	1.74
Algerian	1.75
Dorrien H.S.	1.76
Port type	1.76
Vezenay	1.77
Rioja Tempranillo	1.77
Local Muscat	1.81
Local Shiraz	1.83

The advantage of the Magill yeast over the local Shiraz yeast is obvious from these figures.

To the practical wine maker, the above results put in terms of pounds, shillings, and pence would be of greater interest. For this reason, comparison has been made along these lines, taking the Magill yeast, which gave the highest percentage of alcohol, in contrast to the local Shiraz yeast, which produced the least amount.

The figures for each yeast are:—

Magill	22.38% P.S.
Local Shiraz	21.32% P.S.
Difference	1.06% P.S.

Example.—Fortify 1,000galls. of must, similar to that used in the test fermented with each yeast, to 34 per cent. P.S., using spirit at 64 O.P.

1. Magill Yeast $$\frac{1{,}000 \times 11.62 \times 164}{130 \times 100} = 146.6 \text{ pf. galls.}$$

2. Local Shiraz Yeast $$\frac{1{,}000 \times 12.68 \times 164}{130 \times 100} = 160.0 \text{ pf. galls.}$$

Difference is 13.4 proof gallons.

The difference of 13.4 proof gallons of spirit, at 4s. 3d. plus 6s. 6d. Excise = 10s. 9d. proof gallon, is £7 4s. in favour of the Magill yeast, and shows the value of using a selected, cultured yeast in the production of fortified wine.

The above examples cannot be taken as final, as the number of fermentations was limited, viz., two in each case, but these results open up a field for investigation. To confirm these results it would be necessary to determine the standard variation over a large range of samples, perhaps 20, but the large difference in yield of alcohol offers a very good reason for further work.

GLYCERINE.

During fermentation a relatively large amount of glycerine is formed, dihydroxyacetone and glyceraldehyde acting as contributory compounds in its production.

For the purpose of this test it has been found necessary to determine the amount of sugar which went into the formation of glycerine, and the calculation was based on the following equation:—

$$\underset{180}{C_6H_{12}O_6} + 2H_2 - \underset{184.}{2C_3H_5(OH)_3}$$

Thus 184 grammes of glycerine are derived from 180 grammes of sugar, and 1 gramme of glycerine is derived from $\frac{180}{184}$ grammes of sugar, or 0.98 grammes.

Thus the amount of glycerine formed, multiplied by 0.98, represents the quantity of sugar from which it was derived.

The glycerine produced by each yeast is given in the table below:—

Glycerine, Grammes per 100 cc.

Vezenay	0.54
Dorrien H.S.	0.58
Local Shiraz	0.66
Port type	0.66
Algerian	0.69
Local Muscat	0.69
Rioja Tempranillo	0.70
Magill	0.71

There is considerable variation, 0.54 grammes per 100 cc. being the lowest, and 0.71 grammes per 100 cc. being the highest amount formed, a variation of nearly 24 per cent. The yeasts were consistent in the glycerine formed in the duplicate fermentations. The Magill yeast, which produced the most alcohol, also produced the most glycerine, showing its ability to consume the greater part of the sugar present.

Pasteur's estimate for a normal fermentation is that 3.2 parts of glycerine are formed to 100 parts of sugar fermented. The figure obtained in this test with the Magill yeast supports this estimate, and is almost 3.2.

UNFERMENTED SUGAR.

The whole of the sugar is not consumed by the yeast, and the residual sugar unfermented showed wide variations with the types employed. Some sugar is necessary in any wine, otherwise it would be very harsh on the palate. It assumes the role of protector, and is not likely to be deficient. With maturation this residual sugar enters into various chemical combinations, in the formation of organic compounds.

The unfermented sugar in the wine gives some indication of the amount of sugar consumed, and the Magill yeast, which produced the most alcohol, left only 0.28 grammes of reducing sugar per 100 cc. The must, before fermentation, contained 22.26 grammes of reducing sugar per 100 cc. The local Shiraz yeast left a greater quantity, viz., 0.70 grammes per 100 cc.

By deducting the amount of unfermented sugar from the total sugar before fermentation commenced, the amount of sugar transformed by the yeast can be determined, and with reference to the alcohol table, the percentage of alcohol to sugar transformed, is also assessed as follows:—

$$\frac{\text{Alcohol, grammes per 100 cc.} \times 100.}{\text{Sugar of must—unfermented sugar, grammes per 100 cc.}}$$

The following table gives the percentage for each yeast:—

Per Cent. of Alcohol to Sugar Transformed.

Port type	46.26
Dorrien H.S.	46.01
Magill	45.95
Vezenay	45.93
Algerian	45.65
Rioja Tempranillo	45.42
Local Shiraz	44.62
Local Muscat	44.42

Put in another way, these figures represent grammes of alcohol which are produced from the actual fermentation of 100 grammes of sugar.

The amount of sugar which was left unfermented in the various wines is given below, as dextrose—

Residual Sugar, as Grammes Dextrose per 100 cc.

Algerian	0.22
Magill	0.28
Local Muscat	0.40
Rioja Tempranillo	0.42
Port type	0.44
Dorrien H.S.	0.48
Vezenay	0.62
Local Shiraz	0.70

This table represents the amount of sugar remaining after the first fermentation had been completed. It is more than likely that this figure would be further reduced in the following spring, with the rise in temperature, when a secondary fermentation of unfortified wines generally takes place. Considered in the light of fortified wines, this is of no importance, as the yeast is killed on the addition of fortifying spirit.

TOTAL ACIDS.

The chief consideration here is non-volatile acids, which form the greater part of the total acids. Tartaric and malic acids are present in the must, and appear to some extent in the wine. A considerable portion of the tartaric acid is precipitated, because of the formation of potassium hydrogen tartrate, which is sparingly soluble in water, and even less soluble in dilute alcohol. Certain acids are readily attacked during fermentation, while a small amount of tartaric acid is produced by different yeasts.

In the experiment there was quite a definite range in the acidity, and this may be attributed to the formation chiefly of succinic acid. There may also have been differences in the amounts of tartaric acid deposited. The following table shows the final acidity, both total and fixed, of the various wines:—

Total and Fixed Acids, as Grammes Tartaric Acid per 100 cc.

	Total.	Fixed.
Local Muscat	0.74	0.70
Algerian	0.76	0.69
Magill	0.80	0.76
Local Shiraz	0.80	0.74
Dorrien H.S.	0.81	0.75
Vezenay	0.82	0.77
Port type	0.82	0.77
Rioja Tempranillo	0.84	0.78

The initial total acidity of the must was 0.68, and fixed acid 0.61.

The figures of the above table show a considerable increase over the original acidity of the must. As some acids are consumed during fermentation, necessarily a greater quantity must be produced in order to explain this increase. Succinic acid is probably the acid produced in greatest quantity, and is derived from the amino acids of the must.

VOLATILE ACIDS.

Here again differences are observed, and the figures given below show the production of volatile acid by the various yeasts:—

Volatile Acid, as Grammes Acetic Acid per 100 cc.

Magill	0.030
Local Muscat	0.034
Port type	0.038
Vezenay	0.041
Local Shiraz	0.045
Dorrien H.S.	0.049
Rioja Tempranillo	0.050
Algerian	0.057

The volatile acidity of the must was 0.021 grammes per 100 cc.

These volatile acids affect the bouquet and flavour of the wine by partial esterification, and are known to consist of acetic, formic, propionic and valeric acids.

SUGAR USED BY THE YEAST.

This figure was obtained by calculating the amount of sugar which was necessary to form the alcohol and glycerine, and including the unfermented sugar. This sum, deducted from the sugar present in the must before fermentation, was regarded as being sugar used by the yeast.

The amount of sugar used in this manner varied widely, and to some extent, gives an idea of the economy of the yeast. Thus the two local yeasts, which were the poorest, consumed 2.15 and 2.05 grammes of sugar respectively, while the Magill and Dorrien High Strength yeasts, which were among the best, consumed only 1.11 and 1.22 grammes respectively, in this manner.

This figure is important, as naturally the wine maker does not want to use a yeast which consumes a large portion of the sugar at the expense of alcohol. The figures for each yeast are given below:—

Grammes of Dextrose per 100 cc. Consumed by the Yeast.

Magill	1.11
Dorrien H.S.	1.22
Algerian	1.29
Port type	1.61
Vezenay	1.63
Rioja Tempranillo	1.71
Local Shiraz	2.05
Local Muscat	2.15

A considerable portion of the sugar which is used by the yeast is consumed in the first part of the fermentation, when it lives aerobically, and multiplies very rapidly, using sugar for the formation of yeast tissue.

DISCUSSION OF RESULTS.

This paper has been designed to show the advantage, if any, of using a selected, pure cultured yeast (see 1), and to demonstrate the variation in the production of the by-products of fermentation.

The analyses leave no doubt as to the advisability of using a selected, cultured yeast, in the production of wine, and the difference in yield of alcohol between the types is conclusive evidence in itself.

This interests the distiller and the maker of fortified wines more than the maker of dry wines, as the amount of alcohol produced is an economic factor in production. (See 2.)

Some specific examples of the value of several yeasts may be taken from the foregoing figures. Firstly, in the manufacture of sweet fortified wine. In this case we would choose the port type, or the Dorrien High Strength yeasts. The amount of unfermented sugar is unimportant in this case, as the fermentation is stopped while a large percentage of sugar remains, by the addition of fortifying spirit. The point of particular interest is the percentage of alcohol produced, to the sugar transformed, and these two yeasts gave the best figures in producing the most alcohol from the sugar actually transformed.

For a sherry type, a yeast is required which will ferment out practically the whole of the sugar, and produce a high percentage of alcohol. In this case the Magill yeast comes first, followed by the Algerian, and the chief consideration here is the percentage of sugar necessary in the must to produce 1 per cent. of alcohol by volume. The Magill yeast required the least sugar of any to produce 1 per cent. of alcohol, and consequently is the most economical. Reference to the case quoted under "Alcohol" emphasises the value of this yeast in comparison with others. The same yeast would also be the best for fermenting the juice for distillation purposes, as here again, a high percentage of alcohol is required.

---

(1) The majority of Australian wine makers use cultivated yeasts, without knowing definitely whether or not they are gaining any advantage from the practice.

Many assume that they are obtaining better results than they were when wine was made through the agency of the yeasts occurring naturally on the skins of the grapes. Modifications must of necessity be adopted in ordinary wine making practice in order to secure results, shown to be attainable by the use of selected yeasts.

(2) To say with absolute certainty, however, that the Magill yeast will produce 1 per cent. more of proof spirit than the local Shiraz yeast, from a must of about 12.5° B., is somewhat premature, as this difference would have to be proved conclusively over a large range of samples, and the results submitted to biometric analysis. To be quite emphatic and leave no doubts about the matter, further investigation is necessary, using the differences shown in the tables accompanying this article as the basis for more detailed work.

Possibly the Algerian yeast would be very suitable for fermenting must intended for brandy making, because it produces a large amount of volatile acid, which is an important flavouring constituent, more so in brandy than in wine, where conditions are more favourable to ester formation because of the greater proportion of alcohol. Further, the Algerian yeast can be depended upon to ferment the sugar economically.

The analytical data may not be of such practical interest to the maker of dry wines, as the amount of alcohol produced in dry wines, excepting those used for distillation purposes, is of no very great importance.

The yeast required for dry wines is one which will give a cool, steady fermentation rather than a very vigorous one.

The Vezenay yeast, in practice, is used in making light and delicate types of wine, and gives a steady and cool fermentation. According to report, the Rioja Tempranillo yeast is also used with success for the fermentation of dry wines. This latter yeast was used in the course of these investigations to ferment a tank of Cabernet Sauvignon in 1933, and the fermentation was steady, with a very quick finish, taking much less time to finish the fermentation from 1° B. to 0° B. than the local yeast.

The two yeasts, local Shiraz and local Muscat, would be discarded before any of the other types, as they proved by comparison to be uneconomical in fermentation.

One aspect of the work not taken into consideration was the effect of the different types on the flavour and bouquet. The volatile constituents play a part in the bouquet of the wine, and the fixed substances affect the palate. Muscat juice, when fermented out dry, is hardly a suitable wine for assessing values of this nature. Mr. C. P. Haselgrove, who has had some experience with the Magill and Vezenay yeasts, says there is a marked difference in the flavour and bouquet of the wines fermented with them. The wine from the Vezenay yeast is fine and delicate, while the other, in contrast, is flat.

When the complex nature of fermentation is considered, together with the many by-products formed by the proces, it is only to be expected that there should be considerable variation in the quantity of the various constituents, and the quality of the wine produced. The analyses have shown this to be the case, and clearly illustrate differences between the types.

In conclusion, it may be stated with assurance, that variations do occur in fermentations conducted by different types of yeast, and more important still, that it is an advantage to use a selected, pure cultured yeast in the production of wine, as opposed to allowing the yeast cells adhering to the skins of the grapes to conduct the fermentation.

ACKNOWLEDGMENTS.

For their interest, generous help and suggestions in compiling this work, I desire to thank Dr. A. R. Callaghan (Principal) and Messrs. J. L. Williams, R.D.A., and A. R. Hickinbotham, B.Sc., A.A.C.I., of the staff of Roseworthy College, and also Messrs. C. P. Haselgrove, R.D.A., K. Weidenhofer, R.D.A., and W. G. Geiger.

REFERENCES.

Official and Tentative Methods of Analysis of the A.O.A.C., second edition.
Food Inspection and Analysis, Alfred E. Leach, fourth edition.
The Chemistry of Wine Making, J. T. Hewitt, M.A., D.Sc., &c., H.M. Stationery Office.

	1. Local Muscat.	2. Local Shiraz.	3. Rioja Tempra-nillo.	4. Vezenay.	5. Port Type.	6. Dorrien High Strength.	7. Magill.	8. Algerian.	The Original Must.
Alcohol—									
Volume per cent.	12·30	12·18	12·56	12·58	12·64	12·68	12·79	12·74	—
Grammes, per 100cc.	9·71	9·62	9·92	9·94	9·98	10·02	10·10	10·06	—
Per cent. proof spirit	21·53	21·32	21·98	22·02	22·12	22·19	22·38	22·29	—
Glycerine, in grammes, 100cc.	0·69	0·66	0·70	0·54	0·66	0·58	0·71	0·69	—
Residual sugar, grammes/100cc.	0·40	0·70	0·42	0·62	0·44	0·48	0·28	0·22	—
Amount of sugar needed, in grammes, to produce—									
The alcohol	19·03	18·86	19·44	19·48	19·56	19·99	20·17	20·07	—
The glycerine	0·68	0·65	0·69	0·53	0·65	0·57	0·70	0·68	—
Total sugar consumed plus residual sugar in grammes	20·11	20·21	20·55	20·63	20·65	21·04	21·15	20·97	—
Sugar used by the yeast, in grammes	2·15	2·05	1·71	1·63	1·61	1·22	1·11	1·29	—
Total acids as tartaric, in grammes 100cc.	0·74	0·80	0·84	0·82	0·82	0·81	0·80	0·76	0·65
Fixed acids as tartaric, in grammes, 100cc.	0·70	0·74	0·78	0·77	0·77	0·75	0·76	0·69	0·61
Volatile acids as acetic, in grammes, 100cc.	0·034	0·045	0·05	0·041	0·038	0·049	0·030	0·057	0·021
Per cent. of alcohol produced to sugar transformed	44·42	44·62	45·42	45·93	46·26	46·01	45·95	45·65	—
Per cent. of sugar needed to produce 1 per cent. of alcohol by volume	1·81	1·83	1·77	1·77	1·76	1·76	1·74	1·75	—
Dextrose, in grammes /100cc.	—	—	—	—	—	—	—	—	22·26

PURE-BRED COWS COMPLETED OFFICIAL TEST

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			JUNIOR TWO-YEAR-OLDS—	
Not allotted	Para Wirra Dulcie 2nd..........	J. H. Dawkins, Gawler	Jersey	4/12/33
4162	Murray Glen Beet's Superior	C. J. Morris, Monteith	Friesian	12/12/33
Not allotted	River Glen Countess	S. N. Bott, Murray Bridge	A.I.S.	14/10/33
"	Cudlee Creek Pearl	G. D. Oster, Balaklava	Jersey	15/3/34
8243	Kiama Mayfair	E. A. Groth, Walker's Flat	A.I.S.	27/10/33
34477	Lakeland Fayette	H. A. Follett, Langhorne's Creek .	Jersey	7/10/33
Not allotted	Pella Viola Doone	C. E. Verco, Mount Compass	"	14/10/33
"	Palpara Silver	Mrs. C. E. Mayger, Kapunda	"	19/10/33
41503	Para Wirra Eileen 5th	J. H. Dawkins, Gawler	"	24/12/33
Not allotted	Channel View Sister Grey	Mrs. A. M. Carruthers, Narrung ..	"	19/10/33
"	Lakeland Roxette	H. A. Follett, Langhorne's Creek .	"	26/10/33
39079	Brinkworth Eclipse.............	C. C. T. Ottens, Brinkworth	"	6/3/34
Not allotted	Para Wirra May	J. H. Dawkins, Gawler	"	15/2/34
"	Kyby Ena	Government Farm, Kybybolite ...	Ayrshire	27/1/34
"	Ontario Lady Marge	T. B. Brooks, Clarendon	Jersey	20/3/34
40141	Gunawah Post Mark............	E. W. Pfitzner, Eudunda	"	14/3/34
40157	Hampden Pretty May	A. B. A. Weckert, Brinkworth ...	"	15/3/34
39484	Cumberland Dewdrop's Lass......	L. W. Frost, Saddleworth	"	30/9/33
Not allotted	Llangollen Marjorie	J. Francis & Son, Bugle Ranges...	"	11/12/33
40149	Hampden Aristocratic Lady	J. A. J. Pfitzner, Hampden	"	22/3/34
Not allotted	Palpara Bonnie	Mrs. C. E. Mayger, Kapunda	"	11/11/33
42632	Wooroora Blonds Lotus	A. B. Sieber, Eudunda	"	21/3/34
8314	Long Flat Mermaid 2nd..........	Mrs. A. H. Spackman, Long Flat..	A.I.S.	22/10/33
Not allotted	Eudunda Fern's Morn	W. S. McAuliffe, Eudunda	Jersey	3/11/33
"	Kyby White Rose	Govt. Farm, Kybybolite	Ayrshire	28/2/34
"	Palpara Audrey	Mrs. C. E. Mayger, Kapunda	Jersey	26/10/33
42630	Wooroora Blonde Bell	A. B. Sieber, Eudunda	"	17/3/34
Not allotted	Hampden Olive's Ruby	J. A. J. Pfitzner, Hampden	Jersey	21/11/33
"	Lallawa Chieftain's Carnation.....	J. F. Dodd, Meningie	"	14/4/34
"	Hazelbrook Delma	J. N. Reid, Oakbank	Ayrshire	2/10/33
38618	Woodside Lily's Bouquet	E. W. Pfitzner, Eudunda	Jersey	17/11/33
Not allotted	Kiama Primrose 2nd	E. & A. Nicholls, Woodville	A.I.S.	5/3/34
42633	Wooroora Blonde Morn	A. B. Sieber, Eudunda	Jersey	6/3/34
Not allotted	Kirami Lady Grey	R. J. Laing, Gumeracha	Jersey	7/2/34
"	Delma Spotlight	E. W. Pfitzner, Eudunda.........	"	23/10/33
26735	Strathkellar Blanche 2nd.........	Insp.-General Hospitals, Northfield	Ayrshire	28/2/34
40131	Gum Hill Majesty	P. O. Schutz, Eudunda	Jersey	11/10/33
Not allotted	The Bluff Saphire	H. B. Kuchel, Murray Bridge	A.I.S.	14/11/33
"	Pembroke Gentle	Mrs. C. W. Ansell, Bletchley	Jersey	17/10/35
"	Cudlee Creek Larkspur..........	R. J. Laing, Gumeracha	"	6/3/34
39441	Crofton Souvenier	H. & A. Bohme, Balhannah	"	30/1/34
8497	Northfield Sunflower 2nd.........	Insp.-General Hospitals, Northfield	A.I.S.	24/12/33
Not allotted	Kyby Maggie 5th	Government Farm, Kybybolite ...	Ayrshire	10/11/33
8281	Kiama Olive 6th	E. & A. Nicholls, Woodville	A.I.S.	11/1/34
42631	Wooroora Blonde Duchess	A. B. Sieber, Eudunda	Jersey	24/3/34
38901	Bernoota Violet	H. A. Follett, Langhorne's Creek .	"	16/2/34
Not allotted	Kyby Fancy	Government Farm, Kybybolite ...	Ayrshire	23/3/34
8488	Northfield Limelight's Duchess ...	Insp.-General Hospitals, Northfield	A.I.S.	5/1/34
41500	Para Vale Lady McEwin 2nd	A. J. Marrett, Saddleworth	Jersey	17/11/33
Not allotted	Scrub View Dulcie	A. B. A. Weckert, Brinkworth ...	"	18/11/33
8493	Northfield Prince's Gem	Insp.-General Hospitals, Northfield	A.I.S.	31/12/33
Not allotted	Para Vale Fairy Queen	A. J. Marrett, Saddleworth	Jersey	6/11/33
"	Long Flat Cinderella 3rd	Mrs. A. H. Spackman, Murray Brdg.	A.I.S.	22/10/33
8258	The Bluff Plum	H. B. Kuchel, Murray Bridge	"	21/7/33
8487	Northfield Janet's Sunflower......	Insp.-General Hospitals, Northfield	"	30/12/33
Not allotted	Northfield Lucy................	Insp.-General Hospitals, Northfield	"	16/11/33
8491	Northfield Primrose	Insp.-General Hospitals, Northfield	"	4/1/34
8494	Northfield Royal's Dora	Insp.-General Hospitals, Northfield	"	11/1/34
39789	Glandore Lady Grey............	J. J. O'Sullivan, Tarlee	Jersey	2/3/34
Not allotted	Auldearn Lady Columbine	Mrs. D. G. Steven, Kooringa	"	16/12/33
40622	Lakeland Reinette	H. A. Follett, Langhorne's Creek..	"	9/3/34
8495	Northfield Royal's Princess 3rd ...	Insp.-General Hospitals, Northfield	A.I.S.	1/1/34

BETWEEN JULY 1st, 1934, AND DECEMBER 31st, 1934.

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 230LBS.						
2 4 4	8,217	5·07	416·71	273	Banyule Pylon	—
1 11 25	9,291	4·29	398·49	273	Murray Glen Griselda Beets	—
2 0 25	8,130	4·63	376·73	273	Wangara Dorrie's Royal	—
1 8 13	5,418¾	6·33	343·02	273	Cudlee Creek Masterman	—
2 0 21	7,690¾	4·40	338·59	273	Pembroke of Greyleigh	—
2 5 7	6,157½	5·40	332·25	273	Timbungalung Airboy	—
1 7 21	5,986½	5·53	331·09	273	Dalebank Noble Duke	—
1 9 21	5,546	5·83	323·14	273	Wooroora King's Hero	—
2 4 21	5,755½	5·47	314·89	273	Banyule Pylon	—
2 0 21	6,036	5·20	313·75	273	Makarini of Dalebank	—
2 2 4	6,588¾	4·71	310·57	273	Timbungalung Airboy	—
1 11 29	5,287¾	5·84	308·69	273	Havec Star	—
1 11 17	4,915½	6·21	305·23	273	Para Wirra Percy	—
2 0 19	7,214	4·18	301·85	273	Loyalty of Bridge View	—
1 9 4	5,509¾	5·38	296·21	273	Dalebank Viola's Duke	—
1 11 16	4,925	5·85	288·23	273	His Grace	—
2 5 6	4,872	5·90	287·61	273	Hampden Olive's King	—
2 4 23	5,572½	5·16	287·30	273	Silver Lad of Eudunda	—
1 11 10	6,223¾	4·55	283·46	273	Llangollen Lord Dunbar	—
1 8 9	5,059	5·49	277·88	273	Bellefaire Blonde's Aristocrat	—
2 0 13	4,902	5·66	277·61	273	Wooroora King's Hero	—
1 9 25	5,421¾	5·02	272·33	273	Bellefaire Blonde's Signal	—
2 1 7	7,172	3·74	268·59	273	Wangara Ruth's Limelight	—
1 5 22	5,319	5·04	268·04	273	Makarini 2nd of Dalebank	—
2 3 11	6,066	4·40	266·69	273	Loyalty of Bridge View	—
2 1 25	4,680	5·52	258·19	273	Wooroora King's Hero	—
1 9 12	4,737	5·41	256·13	273	Bellefaire Blonde's Signal	—
1 8 26	4,377	5·79	253·61	273	Bellefair Blonde's Aristocrat	—
2 5 27	4,785	5·21	249·20	240	Lallawa Chieftain 2nd	Dried off
1 9 18	6,729½	3·67	246·94	273	Hazelbrook Progress	—
2 5 24	4,890	5·02	245·31	240	Anemone's Lily Oxford	—
2 3 21	5,222	4·68	244·31	273	Viscount of East View	—
1 7 25	4.597½	5·22	239·87	273	Bellefaire Blonde's Signal	—
2 — 22	4,554½	5·25	239·26	273	Timbungalung Airboy	—
1 7 10	4,077	5·86	239·10	273	Beauty's King of Somerville	—
1 11 13	5,157	4·60	237·02	273	Gertles' Producer of Carracourt	—
2 3 28	4,519½	5·20	234·84	273	Hampden Carnation's Lad	—
1 11 26	5,608½	4·13	231·91	273	Wangara Melba's Searchlight	—
2 1 6	4,680	4·87	227·97	273	Twylish of Para Wirra	—
1 7 25	4,287½	5·29	226·84	273	Cudlee Creek Masterman	—
1 9 2	4,467	5·01	223·62	273	Butter King of Pella	—
2 4 21	6,630	3·37	223·53	273	Melba's Limelight of Wangara	—
1 11 25	5,133	4·34	222·55	273	Loyalty of Bridge View	—
2 1 19	5,295½	4·18	221·61	273	Viscount of East View	—
1 9 29	4,077	5·37	218·90	273	Bellefaire Blonde's Signal	—
1 7 6	4,585½	4·77	218·84	273	Dalebank Mercedes Duke	—
2 — 8	5,209¾	4·19	218·10	273	Gowrie Park Scottish Dandy	—
2 2 14	5,100	4·22	215·22	273	Melba's Limelight of Wangara	—
1 7 12	4,951¾	4·33	214·27	273	Para Vale Cherry Pylon	—
1 4 6	3,799¾	5·62	213·58	273	Scrub View Twylish Lad	—
2 2 1	5,361	3·92	209·99	273	Northfield Limelight's Prince	—
1 7 28	4,608½	4·50	207·30	273	Para Wirra Cherry Pylon	—
1 10 28	5,763	3·57	205·88	273	Wangara Ruth's Limelight	—
1 7 28	4,707	4·21	197·98	273	Wangara Swallow's Limelight 3rd	—
2 3 21	4,912½	3·91	192·33	273	Janet's Royal of Northfield	—
2 1 11	5,151	3·71	191·07	273	Northfield Janet's Success	—
2 4 14	5,389¾	3·50	188·69	273	Janet's Royal of Northfield	—
2 2 28	4,917¾	3·74	183·69	273	Janet's Royal of Northfield	—
2 4 6	3,255	5·32	173·11	240	Morella Tulip's Neat Lad	Owner ceased testing
1 9 23	3,660	4·54	166·01	240	Para Wirra Cherry Pylon	Withdrawn
1 7 29	3,045	4·52	137·65	150	Lakeland Golden Masterpiece	Sold
2 — 22	3,381	3·95	133·64	273	Janet's Royal of Northfield	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
				JUNIOR TWO-YEAR-OLDS—
Not allotted	Glandore Spot	J. J. O'Sullivan, Tarlee	Jersey	24/11/33
"	The Bluff Elegance	H. B. Kuchel, Murray Bridge	A.I.S.	16/1/34
"	Kyby Bobbine	Government Farm, Kybybolite	Ayrshire	1/6/34
Not allotted	Kyby Beth	Government Farm, Kybybolite	Ayrshire	21/2/34
"	Para Wirra Petal	J. H. Dawkins, Gawler	Jersey	12/8/34
"	Stoneyfell Hester 4th	J. W. Crompton, Victor Harbour	"	19/6/34
				SENIOR TWO-YEAR-OLDS—
Not allotted	Murray Glen Griselda Burkeyje	C. J. Morris, Monteith	Friesian	10/1/34
39673	Eudunda Heather Lass	W. S. McAuliffe, Eudunda	Jersey	18/11/33
Not allotted	Para Wirra Beauty	J. H. Dawkins, Gawler	"	5/1/34
"	Lallawa Twylish Carnation	J. F. Dodd, Meningie	"	–/3/34
"	Anama Dainty Jewel	W. Hawker, Clare	Friesian	19/2/34
34649	Hampden Mayfern	J. A. J. Pfitzner, Hampden	Jersey	10/2/34
34687	Wooroora Bonnie June	A. B. Sieber, Eudunda	"	27/1/34
39675	Eudunda Pride's Sunshine	W. S. McAuliffe, Eudunda	"	3/1/34
5372	Kiama Robin 3rd	E. & A. Nicholls, Woodville	A.I.S.	23/1/34
39676	Eudunda Rhonda's Hope	W. S. McAuliffe, Eudunda	Jersey	20/1/34
34537	Llangollen McEwin's Fairy	J. Francis & Son, Bugle Ranges	"	5/10/33
35296	Austral Park Goldora	W. A. Mueller, Ambleside	"	31/10/33
34528	Pella Magnet	W. A. Mueller, Ambleside	"	8/11/33
34689	Wooroora Royal Gem	A. B. Sieber, Eudunda	"	5/3/34
34527	Pella Madeira Kelly	W. P. Eckermann, Eudunda	"	16/2/34
5422	Long Flat Cinderella	Mrs. A. H. Spackman, Long Flat	A.I.S.	10/10/33
Not allotted	Pembroke Duchess 3rd	Mrs. C. W. Ansell, Bletchley	Jersey	25/10/33
"	Glenowie Flower Patch	H. Mountstephen, Monteith	Friesian	12/2/34
34638	Delma Doris	R. J. Laing, Gumeracha	Jersey	2/3/34
34524	Pella Attraction Lotus	W. P. Eckermann, Eudunda	"	29/3/34
Not allotted	Wybalenna Splendour	Mrs. A. H. Spackman, Murray Bge.	A.I.S.	17/3/34
42711	Rosecliffe Sybil's Nancy	J. A. J. Pfitzner, Hampden	Jersey	8/12/33
40130	Gum Hill Beauty	P. O. Schutz, Eudunda	"	15/3/34
Not allotted	Glenowie Princess Pauline	H. Mountstephen, Monteith	Friesian	20/1/34
"	Para Vale Lady McEwin	A. J. Marrett, Saddleworth	Jersey	10/10/33
35311	Austral Park Swirl	H. R. Walsh, Mount Barker	"	11/10/33
34629	Brinkworth Rosebud	C. C. T. Ottens, Brinkworth	"	15/2/34
Not allotted	Para Vale Rose	A. J. Marrett, Saddleworth	"	12/11/33
"	Lallawa Barbara Boronia	J. F. Dodd, Meningie	"	16/3/34
5322	Glen Lossie Sophie	J. M. Irwin, Mount Barker	A.I.S.	16/10/33
35295	Austral Park Gold Tip	H. R. Walsh, Mount Barker	Jersey	6/10/33
Not allotted	Para Vale Molly	A. J. Marrett, Saddleworth	"	31/10/33
8496	Northfield Royal's Sunflower 2nd	Insp.-General Hospitals, Northfield	A.I.S.	8/1/34
Not allotted	Kyby May Queen	Government Farm, Kybybolite	Ayrshire	22/2/34
34531	Pella Twylish Queen	W. P. Eckermann, Eudunda	Jersey	16/10/33
41385	Ontario Pansy	T. B. Brooks, Clarendon	"	30/4/34
41386	Ontario Prosperity	T. B. Brooks, Clarendon	"	5/3/34
				JUNIOR THREE-YEAR-OLDS—
Not allotted	Murray Glen Flower Queen	C. J. Morris, Monteith	Friesian	24/3/34
31099	Hampden Carissa	J. A. J. Pfitzner, Hampden	Jersey	27/12/3
5339	Strathearn Bloom	E. A. Groth, Walker's Flat	A.I.S.	25/2/33
Not allotted	Tuela Dewdrop	F. Coleman, Saddleworth	Jersey	28/9/3
5347	The Bluff Daisy	H. B. Kuchel, Murray Bridge	A.I.S.	14/10/33
5367	Kiama Olive 5th	E. & A. Nicholls, Woodville	"	18/1/34
Not allotted	Tuela Lavender	F. Coleman, Saddleworth	Jersey	11/10/33
"	Tuela Nemesia	F. Coleman, Saddleworth	"	16/11/33
"	Angas Evening Star	E. O. Hancock, Andrews	Ayrshire	5/10/33
38696	Ardmeen Jenifer	R. J. Laing, Gumeracha	Jersey	27/3/34
Not allotted	Anama Pontiac Dainty Maid	W. Hawker, Clare	Friesian	12/11/33
35763	Girrahween Bessie	A. B. Sieber, Eudunda	Jersey	9/2/34
5425	Long Flat Mayflower	Mrs. A. H. Spackman, Long Flat	A.I.S.	30/10/33
Not allotted	Minyeri Annette	E. L. Goode, Narrung	Jersey	7/10/33
				7/10/33
"	Hazelbrook Lorna	J. N. Reid, Oakbank	Ayrshire	24/10/33
39262	Clarendon Eyre Tangerine 5th	J. Francis & Son, Bugle Ranges	Jersey	17/1/34
5354	The Bluff Viola	H. B. Kuchel, Murray Bridge	A.I.S.	16/10/33

OFFICIAL TEST—*continued.*

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test. %	Total Butter-fat. Lbs.	Days Tested.	Sire.	Remarks.
BUTTERFAT STANDARD, 230LBS.—*continued.*						
1 5 18	2,600	4·60	119·57	273	Morella Tulip's Neat Lad	—
2 — 29	2,550	4·42	112·76	180	Wangara Swallow's Limelight 3rd	Owner ceased testing
2 3 19	2,535	4·32	109·41	150	Gowrie Park Scottish Dandy	Dried off
2 1 18	2,160	4·32	93·39	240	Gowrie Park Scottish Dandy	Dried off
1 8 11	1,695	5·30	89·79	90	Para Wirra Collegian	Sold
2 2 7	1,140	5·42	61·74	60	Baxter of Banyule	Withdrawn
BUTTERFAT STANDARD 250LBS.						
2 11 21	11,632½	3·70	430·19	273	River Glen Lord Echo Griselda	—
2 7 20	6,737	6·23	420·01	273	Stonyfell Rambler	—
2 0 15	5,467½	6·77	370·04	273	Para Wirra Sunshine Twylish 2nd	—
2 8 0	6,699	5·40	361·80	273	Chieftain 2nd of Dalebank	—
2 11 2	8,738	4·13	360·91	273	Totara Pontiac Dainty Boy	—
2 9 20	5,336½	6·56	349·90	273	Bellefaire Blonde's Aristocrat	—
2 7 26	5,938½	5·77	342·81	273	Wollingurry Cavalier's Silver King	—
2 8 11	6,469½	5·26	340·48	273	Eudunda Star of Dawn	—
2 7 13	7,891½	4·19	330·67	273	Pembroke of Greyleigh	—
2 8 1	5,460	6·01	328·15	240	Stonyfell Rambler	*
2 6 28	5,749½	5·70	327·64	273	Cudlee Creek Chief	—
2 10 23	5,626½	5·72	321·99	273	Austral Park Goldfinder	* —
2 7 24	6,321	4·93	311·63	273	Werribee Combination	—
2 8 15	5,838	5·33	311·04	273	Wollingurry Cavalier's Silver King	These two cows tied for 14th place
2 8 15	6,148½	5·06	311·04	273	Werribee Combination	
2 10 27	8,339	3·53	294·46	273	Ruth's Limelight of Wangara	—
2 7 24	5,173½	5·58	288·79	273	Para Wirra Twylish	—
2 6 24	7,845	3·66	287·27	273	Glenowie Netherland Prince II.	—
2 8 12	5,409½	5·22	282·14	273	Delma Butter King	—
2 10 3	5,521½	5·08	280·55	273	Werribee Combination	—
2 11 1	7,759½	3·57	277·19	273	Wangara Sunflower's Limelight	—
2 7 11	4,704	5·85	275·36	273	Nancy's Sybil's Gamboge	—
2 9 18	5,969	4·60	274·67	273	Pella Northwood Cavalier	—
2 6 0	7,422	3·64	270·30	273	Glenowie Netherland Prince 2nd	—
2 7 1	5,544	4·78	264·76	273	Para Wirra Cherry Pylon	—
2 7 4	4,465½	5·64	251·93	273	Trecarne Sheik	—
2 6 23	4,818	5·10	245·86	273	Repulse of Somerville	—
2 9 1	5,172	4·74	245·88	273	Para Wirra Cherry Pylon	—
2 8 25	4,755	5·03	239·13	240	Boroni of Rockness	*
2 11 26	6,273	3·50	219·26	273	Swallow's Limelight of Wangara	—
2 9 2	3,814½	5·67	216·34	273	Austral Park Goldfinder	—
2 9 13	4,890	4·33	211·57	240	Para Wirra Cherry Pylon	Withdrawn
2 7 29	4,747½	3·57	169·71	273	Janet's Royal of Northfield	—
2 11 29	3,870	4·28	165·82	240	Gowrie Park Scottish Dandy	Dried off
2 8 8	3,660	4·49	164·19	273	Werribee Combination	—
2 7 27	2,580	4·04	104·32	120	Dalebank Viola's Duke	Withdrawn
2 10 0	2,100	4·81	101·04	150	Dalebank Viola's Duke	Withdrawn
BUTTERFAT STANDARD, 270LBS.						
3 0 21	10,378½	4·18	434·20	273	Murray Glen Netherland King	—
3 5 26	7,220	5·47	394·80	273	Hampden Olive's King	—
3 5 0	8,154	4·59	374·60	273	Sunflower's Searchlight 2nd of Wangara	—
3 2 6	6,163½	6·00	369·96	273	Brinkworth Chris	—
3 2 0	7,969½	4·32	344·40	273	Swallow's Limelight 3rd of Wangara	—
3 0 8	8,985½	3·78	337·85	273	Pembroke of Greyleigh	—
3 2 17	6,924½	4·85	335·84	273	Hampden Winsome King	—
3 2 7	6,300	5·30	333·75	240	Brinkworth Chris	Sold
3 0 0	6,514½	4·97	324·10	273	Scotswood Qualitone	—
3 3 9	5,762½	5·59	322·38	273	Wooroora Starbright's Premier	—
3 2 16	8,572½	3·74	320·85	273	Totara Pontiac Dainty Boy	—
3 3 19	4,981½	6·34	317·53	273	Rosecliff Bright Star	—
3 4 13	8,413½	3·74	314·53	273	Liberton Gladiator 2nd	—
3 4 11	6,313½	4·90	309·60	273	Morella Mercedes Sweet Duke	—
3 4 11	6,780	4·92	333·45	300		—
3 1 25	7,989½	3·85	307·95	273	Belcura Federal	—
3 0 2	6,687	4·60	307·34	273	Clarendon Eyre Eminent's Bingboy	—
3 1 27	7,875	3·80	299·50	273	Swallow's Limelight 3rd of Wangara	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
		JUNIOR THREE-YEAR-OLDS—BUTTERFAT		
25190	Kyby Bessie....................	Government Farm, Kybybolite ...	Ayrshire	22/2/34
41267	Ninyeri Duchess	E. L. Goode, Narrung	Jersey	5/11/33
				5/11/33
Not allotted	Fernden Lady Buttercup.........	E. O. Traeger, Eudunda	"	27/9/33
5398	Lake View Melba 8th	J. M. Irwin, Mount Baker	A.I.S.	29/1/34
5349	The Bluff Opal	H. B. Kuchel, Murray Bridge	"	20/12/33
Not allotted	Kyby Sunbeam	Government Farm, Kybybolite ...	Ayrshire	21/3/34
5323	Glen Lossie Winnie	J. M. Irwin, Mount Barker	A.I.S.	27/3/34
Not allotted	Kyby Marge....................	Government Farm, Kybybolite ...	Ayrshire	6/12/33
5350	The Bluff Searchlight's Janet	H. B. Kuchel, Murray Bridge	A.I.S.	30/1/34
Not allotted	Yatala Wanda	Insp.-General Hospitals, Northfield	"	25/3/34
5353	The Bluff Vanity...............	H. B. Kuchel, Murray Bridge	"	21/4/34
		SENIOR THREE-YEAR-OLDS.—		
Not allotted	El Rimal Winsome	E. O. Hancock, Andrews	Ayrshire	16/10/33
34634	Lakeland Lily	H. B. Peters, Mount Compass	Jersey	13/11/33
Not allotted	Balaklava Griselda Inka	A. E. Middleton, Balaklava	Friesian	17/11/33
34513	Para Wirra Eileen 4th	J. H. Dawkins, Gawler	Jersey	28/3/34
Not allotted	Anama Netherland Pearl	W. Hawker, Clare	Friesian	16/2/34
6656	Tabbagong Dairymaid 11th	J. M. Irwin, Mount Barker	A.I.S.	29/12/33
2322	The Bluff Venus	H. B. Kuchel, Murray Bridge	"	11/10/33
34629	Brinkworth Rhodora	C. C. T. Ottens, Brinkworth	Jersey	9/3/34
34680	Gum Hill June	P. O. Schutz, Eudunda	"	24/3/34
Not allotted	Timbungalung Lady Carnation ...	Mrs. A. M. Carruthers, Narrung ..	"	29/10/33
2321	The Bluff Ruby	H. B. Kuchel, Murray Bridge	A.I.S.	14/11/33
2788	Wollongbar Rosanna	S. W. Burns, Woodside	Guernsey	5/10/33
Not allotted	Melara Princess	Mrs. D. G. Steven, Kooringa	Jersey	27/10/33
31145	Pella Fairy Lotus	H. R. Walsh, Mount Barker	"	24/1/34
29020	Glenalvie Sweet Dinah	A. P. Spehr, Mount Gambier	"	27/9/33
2316	The Bluff Faith	H. B. Kuchel, Murray Bridge	A.I.S.	30/11/33
5352	The Bluff Swallow	H. B. Kuchel, Murray Bridge	"	8/2/34
2349	Northfield Limelight's Flirt 2nd ..	Insp.-General Hospitals, Northfield	"	31/12/33
2318	The Bluff Hope	H. B. Kuchel, Murray Bridge	"	18/1/34
31028	Stoneyfell Hester 3rd	J. W. Crompton, Victor Harbour..	Jersey	20/3/34
5344	The Bluff Amy	H. B. Kuchel, Murray Bridge	A.I.S.	6/4/34
34505	Tuela Schizanthus..............	J. J. O'Sullivan, Tarlee	Jersey	2/8/34
5322	Glen Lossie Sophie	J.M. Irwin, Mount Barker	A.I.S.	24/9/34
		JUNIOR FOUR-YEAR-OLDS.—		
3646	Murray Glen Griselda Tulip	C. J. Morris, Monteith	Friesian	13/12/33
34494	Tuela Delphinium	F. Coleman, Saddleworth	Jersey	7/10/33
22713	El Rimal Pearl	E. O. Hancock, Andrews	Ayrshire	20/1/34
3310	Anama Pontiac Queen	W. Hawker, Clare	Friesian	26/2/34
Not allotted	Murray Glen Griselda's Lassie	C. J. Morris, Monteith	"	28/10/33
28057	Crofton Bonnie Kate	H. & A. Bohme, Balhannah	Jersey	1/10/33
Not allotted	Cotswold Sheila	H. B. Peters, Mount Compass	"	15/10/33
2292	River Glen Ruth's Daisy	S. N. Bott, Murray Bridge	A.I.S.	23/11/33
2306	Sunnybrook Flirt's Rose	J. J. Farrow, Gawler	"	16/10/33
28093	Pella Silver Lotus	W. P. Eckermann, Eudunda.......	Jersey	18/10/33
34515	Para Wirra Magiona 2nd.........	J. H. Dawkins, Gawler	"	27/11/33
3220	Wingeewah Doris 15th...........	J. M. Irwin, Mount Barker	A.I.S.	30/11/33
33593	Brookfield Verbena 18th.........	A. P. Spehr, Mount Gambier	Jersey	28/11/33
31080	Para Vale Lady Starbright	A. J. Marrett, Saddleworth	"	24/11/33
Not allotted	Glenowie Princess Triumph......	H. Mountstephen, Monteith	Friesian	22/1/34
"	Preston Silky	A. P. Spehr, Mount Gambier	Jersey	3/11/33
32971	Staghorn Claribelle	Mrs. D. G. Steven, Kooringa	"	20/10/33
Not allotted	Hazelbrook Heath	J. N. Reid, Oakbank	Ayrshire	1/1/34
2309	Sunnybrook Swallow	J. J. Farrow, Gawler	A.I.S.	2/10/33
25191	Kyby Blonde	Government Farm, Kybybolite ...	Ayrshire	18/3/34
3222	Wingeewah Vera's Belle 4th	J. M. Irwin, Mount Barker	A.I.S.	8/12/33
Not allotted	Kyby Roma	Government Farm, Kybybolite ...	Ayrshire	30/10/33
"	Kyby Wanda	Government Farm, Kybybolite ...	"	22/11/33

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
STANDARD, 270LBS.—*continued.*						
3 2 29	6,021½	4·49	270·54	273	Gowrie Park Scottish Dandy	—
3 1 26	5,179½	4·95	256·44	273	Morella Mercedes Sweet Duke	—
3 1 26	5,685	4·97	282·39	300		
3 — 7	4,512	5·53	249·57	273	Werribee Combination	—
3 4 22	6,442½	3·64	234·27	273	Beauty's Royal of Lake View	—
3 1 4	5,535	3·92	216·96	210	Swallow's Limelight 3rd of Wangara	Owner ceased testing
3 0 14	4,725	4·47	211·44	273	Gowrie Park Scottish Dandy	—
3 5 —	5,753½	3·59	206·83	273	Swallow's Limelight of Wangara	—
3 4 16	4,639½	4·20	194·80	273	Gowrie Park Scottish Dandy	—
3 4 7	5,745	3·37	193·43	180	Melba's Searchlight of Wangara	Withdrawn
3 4 4	3,777½	3·34	126·33	210	Yatala Fleetwood	Dried off
3 — 26	2,175	4·35	94·56	90	Swallow's Limelight 3rd of Wangara	Withdrawn
BUTTERFAT STANDARD, 290LBS.						
3 8 18	11,089½	4·44	492·37	273	Gowrie Park Dairyman	—
3 10 13	8,550½	5·67	485·08	273	Dalebank Flavius	—
3 9 2	12,187½	3·82	465·62	273	Glenowie Beets Griselda	—
3 11 0	7,632	5·76	439·45	273	Banyule Pylon	
3 6 19	12,801	3·25	416,57	273	Longbeach Netherland King 2nd	—
3 8 9	10,084½	3·74	377·12	273	Regent of Tabbagong	—
3 8 8	8,338½	4·17	347·90	273	Swallow's Limelight 3rd of Wangara	—
3 9 16	6,391½	5·29	337·98	273	General Chris of Penrhyn	—
3 9 4	6,222	5·21	324·15	273	Hampden Carnation Lad	—
3 7 13	5,917½	5·39	318·77	273	Timbungalung Butter King	—
3 10 4	7,233	4·29	310·78	273	Swallow's Limelight 3rd of Wangara	—
3 9 28	5,069	6·00	304·11	273	Wollongbar Hopeful	—
3 9 17	7,242½	4·16	301·48	273	Malara Royal Silvermine	—
3 11 12	4,894½	6·08	297·87	273	Wollingurry Cavalier's Silver King	—
3 9 10	5,367	4·88	261·90	273	Werribee Fancy Masterpiece	—
3 10 3	6,298½	3·91	246·02	273	Swallow's Limelight 3rd of Wangara	—
3 6 7	6,435	3·72	239·35	180	Swallow's Limelight 3rd of Wangara	Withdrawn
3 11 3	6,186	3·25	201·34	273	Melba's Limelight of Wangara	—
3 11 19	5,310	3·78	200·59	180	Swallow's Limelight 3rd of Wangara	Withdrawn
3 7 18	2,805	5.96	167·15	180	Mack of Glenford	Withdrawn
3 9 7	3,720	3·51	130·60	120	Swallows Limelight 3rd of Wangara	Withdrawn
3 10 22	1,860	4·92	91·42	60	Brinkworth Chris	Owner ceased testing
3 11 4	2,310	3·55	81·93	60	Swallow's Limelight of Wangara	Withdrawn
BUTTERFAT STANDARD, 310LBS.						
4 4 9	11,757	4·40	517·10	273	River Glen Lord Echo Griselda	—
4 1 3	8,847	5·68	502·32	273	Baron of Dalebank	—
4 4 19	10,840½	4·47	484·07	273	Gowrie Park Dairyman	—
4 5 1	12,882	3·75	483·59	273	Totara Pontiac Daintyboy	—
4 2 10	13,598	3·41	463·77	273	River Glen Lord Echo Griselda	—
4 4 2	8,147	5·44	443·08	273	Butter King of Pella	—
4 2 0	8,736	5·04	440·67	273	Duke of Dalebank	—
4 1 2	9,973½	4·25	424·19	273	Ruth's Limelight of Wangara	—
4 2 23	8,851½	4·44	393·20	273	Jellicoe's Belmont of Illawarra	—
4 5 2	7,620	4·94	376·50	273	Wollingurry Cavalier's Silver King	—
4 0 22	6,573	5·44	357·79	273	Banyule Pylon	—
4 3 25	9,281	3·84	356·46	273	Sir William of Willow Glen	—
4 1 0	6,556½	5·29	347·10	273	Sweetbread's Duke of Glen Iris	—
4 0 20	6,319½	5·48	346·56	273	Brucevale Lord Fancy Starbright	—
4 4 1	8,545½	3·99	340·97	273	Murray Glen Prince Wooraki	—
4 3 18	7,550	4·23	319·19	273	Preston Pretty King	—
4 1 23	5,753	5·42	311·60	273	Staghorn Northlark's Masterpiece	—
4 2 19	7,814	3·91	305·43	273	El Rimal Count Rival	—
4 1 1	7,798½	3·66	285·37	273	Jellicoe's Belmont of Illawarra	—
4 0 24	6,046½	4·47	270·51	273	Gowrie Park Scottish Dandy	—
4 3 18	7,515	3·50	263·12	210	Daphne's Defraney of Hill View	Temp. Exempt.
4 1 8	5,040	4·42	222·91	240	Ida's Laird of Gowrie Park	
4 5 15	4,352	4·67	203·39	273	Gowrie Park Scottish Dandy	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
				SENIOR FOUR-YEAR-OLDS.—
34681	Cotswold Gem	H. B. Peters, Mount Compass	Jersey	17/11/33
25039	Penrhyn Flavia 18th	W. S. McAuliffe, Eudunda	"	6/10/33
2834	Liberton Honeycomb	E. and A. Nicholls, Woodville	A.I.S.	3/10/33
Not allotted	Hazelbrook Dulcie	J. N. Reid, Oakbank	Ayrshire	5/12/33
31102	Hampden Juanita	J. A. J. Pfitzner, Hampden	Jersey	1/3/34
2481	Glenlea Dixie 5th	E. T. Vinall, Brighton	Guernsey	5/10/33
31156	Scrub View Dainty's Lass	A. B. Weckert, Brinkworth	Jersey	19/12/33
2320	The Bluff Masher's Trinket	H. B. Kuchel, Murray Bridge	A.I.S.	6/11/33
Not allotted	Glandore Lou	J. J. O'Sullivan, Tarlee	Jersey	26/2/34
31045	Llangollen Marge	J. Francis & Son, Bugle Ranges	"	24/6/34
2351	Northfield Muirhead's Sunflower	Inspector-General of Hospitals, Northfield	A.I.S.	21/3/34
2603	Minnamurra Bonnie Girl	S. W. Burns, Woodside	Guernsey	28/1/34
34504	Tuela Sage	J. J. O'Sullivan, Tarlee	Jersey	28/7/34
34322	Delma Sweet Lotus	E. W. Pfitzner, Eudunda	"	31/8/34
34698	Fernden Lady Bell	E. O. Traeger, Eudunda	"	—/6/34
				MATURE COWS.—BUTTERFAT
3655	Murray Glen Princess Maggie	C. J. Morris, Monteith	Friesian	8/10/33 8/10/33
3648	Murray Glen Inka Olda	C. J. Morris, Monteith	"	23/3/34
3652	Murray Glen Netherland Buttergirl	C. J. Morris, Monteith	"	3/3/34
2503	Murray Glen Segis Inka	C. J. Morris, Monteith	"	9/10/33
17872	Cloud of Toora	S. N. Bott, Murray Bridge	A.I.S.	8/1/34
21917	Murray Glen Inka Tulip	C. J. Morris, Monteith	Friesian	1/10/33
29116	Belgonia Clementine	A. Kelly, Milang	Jersey	20/3/34
18084	Para Wirra Millie's Beauty	J. H. Dawkins, Gawler	"	15/1/34
28328	Kiama Olive 3rd	E. and A. Nicholls, Woodville	A.I.S.	25/2/34
10777	Gum Hill Lady Floretta	P. O. Schutz, Eudunda	Jersey	27/9/33
17922	Roseworthy Euridite	Agricultural College, Roseworthy	"	23/10/3
28330	Kiama Primrose	E. and A. Nicholls, Woodville	A.I.S.	12/1/34
19484	Wompini Lady Jane Grey	H. B. Peters, Mount Compass	Jersey	25/2/34
24622	Azalea of Tuela	F. Coleman, Saddleworth	"	3/10/33
28071	Tuela Heather	F. Coleman, Saddleworth	"	28/10/33
25027	St. Helier's Carnation	J. F. Dodd, Meningie	"	20/3/34
25056	Roseworthy Sciential	Agricultural College, Roseworthy	"	1/2/34
24861	Fernden Lady Beth	O. H. Woodward, Gilles Plains	"	20/11/33
23553	Dalebank Carnation 4th	J. M. Bray, Langhorne's Creek	"	14/1/34
20740	Sweetbriar of Tuela	F. Coleman, Saddleworth	"	6/11/33
31117	Wompini Belle	Mrs. W. A. Pool, Cudlee Creek	"	23/11/33
24845	Penrhyn Lady McEwin 26th	J. Francis & Son, Bugle Ranges	"	22/1/34
28157	Wooroora Dorette	A. Kelly, Milang	"	27/2/34
24990	Brinkworth Myra	C. C. T. Ottens, Brinkworth	"	17/2/34
24695	Para Wirra Cherry	J. H. Dawkins, Gawler	"	26/2/34
28068	Tuela Freezia 2nd	Mrs. D. G. Steven, Kooringa	"	6/11/33
23629	Roseworthy Sunbeam	Agricultural College, Roseworthy	"	9/3/34
18420	Kyby Bluebell	Government Farm, Kybybolite	Ayrshire	22/3/34
39489	Dalebank Pansy	H. A. Follett, Langhorne's Creek	Jersey	13/10/33
Not allotted	Cotswold Colas	R. J. Laing, Gumeracha	"	28/9/33
20817	Rosemary of Waterfall	A. E. Middleton, Balaklava	"	7/11/33
19042	Flower of Dalebank	J. M. Bray, Langhorne's Creek	"	1/10/33
2991	Anama Gem's Diamond	W. Hawker, Clare	Friesian	26/3/34
18372	Madge of Elderslie	Mrs. A. H. Spackman, Long Flat	A.I.S.	2/1/34
Not allotted	Millie 11th of Melross	Dunleith Pastoral Co., Ashbourne	"	31/1/34
28136	Barton Croft Sweetbriar	A. J. Marrett, Saddleworth	Jersey	12/2/34
2455	Glenowie Echo Posch	H. Mountstephen, Monteith	Friesian	24/11/33
15854	Carracourt Blanche 4th	Insp.-General Hospitals, Northfield	Ayrshire	17/3/34
28163	Morella Belle 3rd	E. L. Goode, Narrung	Jersey	11/11/33
23634	Cheriton Foam	H. R. Walsh, Mount Barker	"	6/2/34
24694	Pembroke Sylvia	Mrs. C. W. Ansell, Bletchley	"	16/11/33
23588	Eudunda Merden's Damsel	W. S. McAuliffe, Eudunda	"	29/1/34
18561	Janet of East View	H. B. Kuchel, Murray Bridge	A.I.S.	1/1/34
31076	Wompini Moss Rose	Jas. McEwin, Houghton	Jersey	24/12/33
15056	Rockness Goldfinch	H. B. Peters, Mount Compass	"	20/11/33
18311	Searchlight's Tot II. of Wongara	E. A. Groth, Walker's Flat	A.I.S.	23/12/33
14706	Kyby Bonnie	Government Farm, Kybybolite	Ayrshire	26/2/34
9017	Rose of Kyby	Government Farm, Kybybolite	"	1/11/33
20768	Lady McEwin of Cumberland	L. W. Frost, Saddleworth	Jersey	7/10/33
21832	Kyby Bess	Government Farm, Kybybolite	Ayrshire	11/1/34
24692	Pembroke Duchess	Mrs. C. W. Ansell, Bletchley	Jersey	13/12/33
21665	Wompini Flower	J. Francis & Son, Bugle Ranges	"	8/3/34

OFFICIAL TEST—*continued.*

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test. %	Total Butter-fat. Lbs.	Days Tested.	Sire.	Remarks.
BUTTERFAT STANDARD, 330LBS.						
4 6 21	8,098½	5·39	436·55	273	Dalebank Duke	—
4 11 22	8,920½	4·60	410·13	273	Makarini 2nd of Dalebank	—
4 10 8	9,279	3·81	353·70	273	Limit of East View	—
4 7 12	7,983	4·26	339·85	273	El Rimal Count Rival	—
4 8 2	6,206½	5·14	318·90	273	Hampden Olive's King	—
4 6 4	5,255	5·89	309·49	273	Glenlea Hilda's Valour 2nd	—
4 7 27	6,175½	4·96	306·36	273	Holly's King of Hampden	—
4 6 22	7,050	3·73	262·95	240	Waratah's Masher of The Bluff	Dry
4 7 6	5,235	4·50	235·68	240	Oakhill Milklad 2nd	Owner ceased testing
4 7 3	3,990	5·44	217·10	120	Makarini 2nd of Dalebank	—
4 9 1	4,878½	3·92	191·07	273	Muirhead of Ben Lomond	—
4 11 23	3,450	4·98	171·74	210	Caramana Favour	Withdrawn
4 10 7	1,950	4·35	84·75	60	Baron of Dalebank	Owner ceased testing
4 7 7	960	4·57	43·89	30	Beauty's King of Somerville	Temp. exemption
4 8 0	960	4·42	42·42	30	Werribee Combination	Owner ceased testing
STANDARD, 350LBS.						
5 11 11	18,348	4·15	761·81	273	Glenburn Segis Griselda	—
5 11 11	20,965	4·19	878·59	365	—	—
5 0 10	12,996	4·69	609·75	273	River Glen Lord Echo Griselda	—
5 5 9	15,616½	3·85	601·08	273	Longbeach Netherland King II.	—
7 4 17	15,588	3·82	595·31	273	Glenburn Segis Griselda	—
6 4 17	12,537½	4·04	506·86	273	Iris 5th's Superb of Toora	—
9 2 15	12,576	3·92	493·42	273	River Glen Lord Echo Griselda	—
6 2 14	8,226	5·75	472·87	273	Aerial of Banyule	—
5 5 14	7,696½	5·82	448·27	273	Molly 5th's Audrey Twylish of Banyule	—
6 11 0	11,896½	3·67	437·01	273	Pembroke of Greyleigh	—
10 0 1	9,666	4·51	435·70	273	Werribee Starbright's Fancy	—
9 2 22	6,040½	7·11	429·29	273	King Solomon of Dalebank	—
7 5 25	10,942½	3·90	426·66	273	Pembroke of Greyleigh	—
6 4 27	7,293	5·84	425·97	273	Werribee Masterman	—
11 1 0	8,632½	4·75	410·29	273	Admiral 2nd of Dalebank	—
6 3 3	7,830	5·23	409·83	273	Maid's Success of Linden	—
8 3 13	6,990	5·82	407·14	240	Nada's Chief of Linden	Withdrawn
6 1 13	6,348	6·36	403·87	273	King Solomon of Dalebank	—
6 8 23	7,945	5·03	399·57	273	Werribee Combination	—
6 11 17	7,788	5·10	397·92	273	Twylish of Dalebank	—
8 7 5	8,079½	4·91	396·99	273	Maid's Success of Linden	—
5 8 22	7,059½	5·56	392 42	273	Werribee Masterman	—
6 5 28	7,321½	5·18	378·91	273	Socrates of Rockness	—
5 9 4	6,156½	5·99	368·57	273	Wollingurry Cavalier's Silver King	—
5 11 24	5,872½	6·19	363·81	273	General Chris of Penrhyn	—
7 6 14	6,736½	5·37	362·06	273	Twylish of Para Wirra	—
5 2 20	6,895½	5·19	357·87	273	Tuela Eric	—
7 6 22	6,757½	5·15	348·60	273	Courtier of Dalebank	—
6 4 24	8,178½	4·26	348·00	273	Loyalty of Bridge View	—
13 0 21	6,273	5·53	346·84	273	Quality of Dalebank	—
5 1 27	7,029	4·88	342·77	273	Duke of Dalebank	—
10 9 14	6,136½	5·52	338·85	273	Major Grey of Waterfall	—
8 8 1	7,582½	4·41	334·54	273	Baxter of Banyule	—
7 0 18	9,991½	3·32	331·39	273	Inavale Lady's Pride	—
6 7 13	8,600½	3·84	330·59	273	Mayflower's Jellicoe of Illawarra	—
5 6 17	8,487	3·87	328·82	273	Melton of Melross	—
5 10 13	6,309	5·20	327·97	273	Rambler 2nd of Linden	—
7 11 20	9,739½	3·33	324·40	273	River Glen Lord Echo Griselda	—
8 6 7	7,783½	4·15	322·09	273	Mab's Pride of Gleneira	—
5 5 29	6,592½	4·88	321·57	273	Anemone's Chief of Morella	—
7 2 5	5,679½	5·60	317·92	273	Maud's Chief 2nd of Linden	—
7 0 0	5,112	6·20	317·01	273	Triumph 2nd of Dalebank	—
7 7 17	6,045	5·06	305·83	240	Lord Merden of Eudunda	Owner ceased testing
9 0 18	7,815	3·75	293·27	210	Belmont of Darbalara	Owner ceased testing
5 1 0	5,160	5·64	290·85	240	Wompini Noble	Withdrawn
11 0 8	5,175	5·59	289·11	273	Bonnie Chief of Inviewood	—
5 7 20	6,580½	4·39	288·64	273	Searchlight of Darbalara	—
9 0 18	6,856½	4·18	286·94	273	Loyalty of Bridge View	—
13 11 12	7,527	3·71	279·27	273	Anthony of Gleneira	—
8 6 14	5,976	4·44	265·17	273	Baxter of Banyule	—
5 2 7	6,723	3·91	263·10	273	Loyalty of Bridge View	—
7 5 3	4,933½	5·30	261·48	273	Triumph 2nd of Dalebank	—
8 6 2	4,710	5·37	252·99	240	Stem of Melrose	Owner ceased testing

PURE BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
				MATURE COWS—BUTTERFAT—
Not allotted	West Kilbride Loleta	Insp.-General Hospitals, Northfield	Ayrshire	12/3/34
1696	Tabbagong Topsy 8th	J. M. Irwin, Mount Barker	A.I.S.	26/2/34
1758	Glenlea Fi Fi	E. T. Vinall, Brighton	Guernsey	27/1/34
25029	Havec Dahlia	Mrs. C. E. Mayger, Kapunda	Jersey	16/1/34
2125	Glenlea Fi Fi 2nd	E. T. Vinall, Brighton	Guernsey	21/12/33
17889	Daphne of The Bluff	H. B. Kuchel, Murray Bridge	A.I.S.	7/2/34
2344	Northfield Blossom	Insp.-General Hospitals, Northfield	"	2/11/33
Not allotted	Morella Princella 2nd	H. R. Walsh, Mount Barker	Jersey	3/12/33
17892	Masher's Lanka of The Bluff	H. B. Kuchel, Murray Bridge	A.I.S.	7/4/34
17880	Lucy 2nd of Toora	Insp.-General Hospitals, Northfield	"	7/2/34
24959	Pella Lorna Doone	W. P. Eckermann, Eudunda	Jersey	19/2/34
16394	Kyby Snowbell	Government Farm, Kybybolite	Ayrshire	22/12/33
28094	Pella Solanum	W. P. Eckermann, Eudunda	Jersey	13/2/34
28059	Myrtle Bank Maglona 2nd	H. & A. Bohme, Balhannah	"	20/3/34
17888	Glimmer of Dalebank	J. J. O'Sullivan, Tarlee	"	21/5/34
15032	Flirt of Northfield	Insp.-General Hospitals, Northfield	A.I.S.	13/2/34
24965	Pella Sweet Lotus	W. P. Eckermann, Eudunda	Jersey	28/2/34
17013	Gem 16th of Darbalara	H. B. Kuchel, Murray Bridge	A.I.S.	18/2/34
3650	Murray Glen Inka Tulip 3rd	C. J. Morris, Monteith	Friesian	18/5/34
24962	Pella Rose Marie	C. E. Verco, Mount Compass	Jersey	8/8/34
3347	Bloomfield Alcartra Joan	W. Hawker, Clare	Friesian	28/8/34
31020	Ontario Millie	T. B. Brooks, Clarendon	Jersey	15/8/34

BUTTERFAT TESTS (OFFICIAL) FOR HALF-YEAR ENDED DECEMBER 31ST, 1934, OF PURE AND OF FOUNDATION

	Name of Cow.	Owner and Address.	Breed.
			JUNIOR TWO-YEAR-OLDS.—
Calf Roll	Glenowie Lady Helen	H. Mountstephen, Monteith	Friesian
Calf Roll	Balaklava Collegian's Melody	A. E. Middleton, Balaklava	Jersey
Calf Roll	Balaklava Collegian's Lulu	A. E. Middleton, Balaklava	Jersey
Calf Roll	Balaklava Repulse Collette	A. E. Middleton, Balaklava	Jersey
Calf Roll	Balaklava Griselda Violass	A. E. Middleton, Balaklava	Friesian
Calf Roll	Glenowie Salma Patch	H. Mountstephen, Monteith	"
Calf Roll	Kyby Balloch	Government Farm, Kybybolite	Ayrshire
Calf Roll	Kyby Rapture	Government Farm, Kybybolite	"
			SENIOR TWO-YEAR-OLDS.—
Appendix C	Strathearn Rose Marie	E. A. Groth, Walker's Flat	A.I.S.
			SENIOR THREE-YEAR-OLDS.—
Appendix B	Mt. Annaan Cowrie	J. M. Irwin, Mount Barker	A.I.S.
Appendix C	Strathearn Countess Ramona	E. A. Groth, Walker's Flat	"
Appendix C	Strathearn Primrose	E. A. Groth, Walker's Flat	"
			MATURE COWS.—BUTTERFAT
Appendix D	Strathearn Countess	E. A. Groth, Walker's Flat	A.I.S.
Appendix D	Strathearn Ruby 2nd	E. A. Groth, Walker's Flat	"

OFFICIAL TEST *continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butter fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
STANDARD 350LBS—*continued.*						
5 6 12	5,370	4·69	251·92	273	West Kilbride Marquis	—
6 11 5	6,699	3·72	249·31	273	Mayflower's Repeater of Hill View	—
6 8 1	5,367	4·20	225·29	273	Glenlea Vera's Valour 2nd	—
5 9 16	3,735	5·98	223·19	210	Oliver of Hampden	Withdrawn
5 8 12	3,928½	5·65	221·97	273	Glenlea Hilda's Valour 2nd	—
5 11 11	6,105	3·62	221·00	180	Waratah's Masher of The Bluff	Owner ceased testing
11 8 20	5,928	3·59	213·08	273	Somerset	—
5 2 2	3,690	5·55	204·87	240	Anemore's Chief of Morella	—*
6 3 21	4,800	4·15	198·99	120	Waratah's Masher of The Bluff	Owner ceased testing
6 3 26	5,515½	3·55	195·63	273	Iris 5th Superb of Toora	—
6 0 2	3,915	4·80	187·84	150	Melford's Butter Lad of Pella	Owner ceased testing
7 9 11	3,690	4·37	161·20	210	Loyalty of Bridge View	Dried off
5 3 5	3,690	4·30	158·67	150	Melford's Butter Lad of Pella	Owner ceased testing
5 6 17	2,730	5·78	157·81	180	Annett's Chief of Linden	Dried off
9 9 11	2,935	5·35	157·02	150	Duke of Dalebank	Owner ceased testing
7 2 27	3,405	4·33	147·34	180	Janet's Hayliss of Ben Lomond	Dried off
6 1 26	2,880	5·11	147·21	120	Melford's King of Pella	Owner ceased testing
9 3 28	3,405	4·08	138·81	150	Yeoman of Darbalara	Owner ceased testing
6 11 5	3,450	3·82	131·85	60	River Glen Lord Echo Griselda	Withdrawn
6 6 18	2,295	4·79	109·88	60	Melford's Butter Lad of Pella	Sold
6 9 24	3,000	3·15	94·50	60	Bloomfield Alcarta Clothilde	Exemption
7 0 25	870	4·35	37·85	30	Molly 5th's Audrey Twylish of Banyule	Exemption

BREEDS WHICH ON 31ST DECEMBER, 1934, WERE REGISTERED IN THE CALF ROLL ONLY, AND APPENDIX COWS.

Calved.	Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.
	Y. M. D.	Lbs.	%	Lbs.		
BUTTERFAT STANDARD 230LBS.						
4/1/34	2 3 7	9,304½	3·73	347·37	273	Glenowie Colantha Netherland
14/2/34	2 4 25	5,400	5·81	313·50	273	Balaklava Skylee's Collegian
18/10/33	1 7 15	5,020½	6·12	307·40	273	Balaklava Skylee's Collegian
25/10/33	2 1 14	5,180	5·89	305·35	273	Balaklava Rhodesian's Repulse
16/4/34	2 3 11	8,957½	3·35	299·98	273	Glenowie Beets Griselda
25/10/33	1 5 8	8,269½	3·48	288·14	273	Glenowie Netherland Prince 2nd
		10,417	3·50	364·37	365	
7/10/33	1 11 5	4,416	4·05	178·87	273	Gowrie Park Scottish Dandy
30/10/33	1 10 25	2,835	4·55	129·12	240	Gowrie Park Scottish Dandy*
BUTTERFAT STANDARD, 250LBS.						
-/4/34	2 10 0	7,057½	4·15	293·14	240	Sunflower's Searchlight 2nd of Wangara
BUTTERFAT STANDARD, 290LBS.						
-/4/34	3 7 0	9,568½	3·67	350·96	273	Pet's Belmont of Kiama
22/11/33	3 10 19	6,813	4·54	309·38	273	Sunflower's Searchlight 2nd of Wangara
30/1/34	3 6 8	6,730½	4·39	295·51	273	Sunflower's Searchlight 2nd of Wangara
STANDARD, 350LBS.						
29/12/33	9 6 8	9,561	4·23	404·66	273	Gayboy
24/1/34	9 7 6	7,035	4·08	287·24	240	Gayboy (Dried off)

COWS SUBMITTED FOR 365 DAYS OFFICIAL TEST.

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
				JUNIOR TWO-YEAR-OLDS.—
Not allotted	Glenowie Colantha May	H. Mountstephen, Monteith	Friesian	21/9/33
				JUNIOR FOUR-YEAR-OLDS.—
5371	Kiama Robin 2nd	E. & A Nicholls, Woodville	A.I.S.	9/7/33
18571	Pride 3rd of Elderslie	Mrs. A. H. Spackman, Long Flat	"	20/9/33
				SENIOR FOUR-YEAR-OLDS.—
Not allotted	Glenowie Netherland Mary	H. Mountstephen, Monteith	Friesian	6/9/33
28162	Anemone 3rd of Morella	E. L. Goode, Narrung	Jersey	18/7/33
				MATURE COWS.—BUTTERFAT
1919	Murray Glen Sylvia Patch	C. J. Morris, Monteith	Friesian	26/8/33
2500	Murray Glen Echo Topsy	C. J. Morris, Monteith	"	21/8/33
2194	Glenowie Griselda Posch	H. Mountstephen, Monteith	"	23/7/33

NOTE.—Tenth tests were required for the cows marked thus :*, but could not be obtained, therefore the

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Dec.	Per Cow during Dec.	Per Cow October to Dec.	Per Herd during Dec.	Per Cow during Dec.	Per Cow October to Dec.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	32	27·23	14,412½	450·39	1,549·32	739·86	23·12	80·99	5·13
5/D ..	30	27·32	15,103¾	503·45	1,643·57	809·30	26·98	87·85	5·36
5/E ..	38	36·94	24,381	641·12	1,894·46	1,251·14	32·90	94·70	5·17
5/R ..	72	67·19	29,752	413·22	1,647·20	1,401·24	19·46	73·37	4·71
5/EE .	23	23	12,074½	524·98	1,858·52	621·46	27·02	90·32	5·15
5/Z ..	33	33	25,125¾	761·38	2,299·71	1,259·16	38·16	116·17	5·01
5/KK	15·97	14·65	13,816	865·12	2,087·80	627·45	39·29	97·55	4·54
5/WW	20	19·65	10,167½	508·38	1,616·13	484·19	24·21	76·74	4·76
5/XX	20	19	10,989¾	549·48	1,867·38	548·50	27·43	94·51	4·99
5/YY	11	10·23	4,050	368·18	1,564·40	197·50	17·95	77·81	4·88
5/AAA	17	15	8,540½	502·38	1,806·71	419·31	24·67	89·78	4·91
5/BBB	17	16	7,331½	431·26	1,784·59	343·55	20·21	84·48	4·69
5/DDD	26	24·94	22,128	851·06	2,652·54	824·24	31·70	101·88	3·72
5/EEE	17	15·19	11,655	688·57	1,855·98	525·64	30·92	85·27	4·51
5/FFF	10	10	6,541	654·10	2,129·35	284·75	28·48	95·87	4·85
5/GGG	9·58	9·39	6,601	689·04	1,908·09	303·61	31·69	83·68	4·60
5/HHH	14	12·19	9,631½	687 97	2,296·93	391·75	27·98	91·11	4·05
Means	23·85	22·41	13,664·74	572·80	1,873·97	648·98	27·20	88·60	4·75

Figures for 273 days published in previous list for half-year ended June 30th, 1934.

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	—	Lbs.			
BUTTERFAT STANDARD 230LBS.						
1 10 6	12,955	3·80	491·98	365	Glenowie Colantha Netherland	—
BUTTERFAT STANDARD, 310LBS.						
4 5 4	21,895	4·09	895·81	365	Viscount of East View	—
4 3 20	18,810	3·43	645·01	365	Marvellous of Hill View	—
BUTTERFAT STANDARD, 330LBS.						
4 11 1	20,190	3·39	683·50	330	Longbeach Netherland King 2nd	—
4 11 11	10,265	5·08	521·26	365	Molly 5th's Audrey Twylish of Banyule	—
STANDARD, 350LBS.						
9 3 17	22,108	3·76	832·29	365	Burnbank Sylvia Patch	—
7 1 17	19,755	3·60	712·15	330	River Glen Lord Echo Griselda	—
8 8 10	23,400	3·04	711·50	365	River Glen Sir Pietje Griselda	—

cows concerned have been credited with only 240 days production.

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Dec.	Per Cow during Dec.	Per Cow July to Dec.	Per Herd during Dec.	Per Cow during Dec.	Per Cow July to Dec.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	6·42	5·42	4,694	731·15	2,813·08	208·32	32·45	135·24	4·44
7/L ..	32	27·87	23,753½	742·30	3,512·51	1,073·71	33·55	155·51	4·52
7/P ..	26	24·52	15,661½	602·36	4,016·78	751·22	28·89	193·10	4·80
7/AA .	26	23·65	16,669½	641·13	3,656·59	776·80	29·88	163·93	4·65
7/TT .	15·55	13·74	12,058	775·42	4,472·90	535·52	34·43	197·13	4·43
7/UU.	28	25·19	11,025½	393·75	3,184·21	467·96	16·71	135·53	4·24
7/XX	23	21·16	21,404½	938·67	3,993·76	1,180·36	51·75	212·08	5·55
7/BBB	62·77	50·68	37,786½	601·98	3,441·10	1,740·32	27·73	153·35	4·61
7/CCC	24·61	19·77	13,195	536·18	3,276·14	588·47	23·91	142·19	4·44
7/DDD	13	11·13	7,521½	578·57	3,806·90	367·42	28·26	184·78	4·88
7/EEE	10	7·74	4,770½	477·05	3,597·06	245·76	24·58	184·93	5·15
7/GGG	17	12	7,491½	440·68	2,197·19	336·66	19·80	99·90	4·47
7/HHH	12	12	8,711	725·91	4,351·10	293·53	24·46	151·95	3·37
7/III .	16	16	14,988½	936·78	4,618·25	523·13	32·70	160·30	3·49
7/JJJ.	12·81	11·65	4,992½	389·73	2,861·62	241·52	18·85	136·95	4·84
7/KKK	31·74	31·48	25,658	804·56	3,199·21	1,276·53	40·03	160·91	4·92
7/LLL	21·58	20·61	14,865	688·83	3,536·82	780·76	36·18	180·81	5·25
7/MMM	14	12·52	7,716½	551·18	2,626·27	412·76	29·48	136·54	5·35
Means	21·81	19·29	14,053·50	644·53	3,528·12	655·60	30·07	161·71	4·67

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during Dec.	Milk. Per Cow during Dec.	Butterfat. Per Herd during Dec.	Butterfat. Per Cow during Dec.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	18·58	16·58	7,044	391·33	359·20	19·96	5·10
6/C	18·94	16·19	13,056	689·33	513·34	27·10	3·93
6/Y	14	6·71	5,434	388·14	232·82	16·63	4·28
6/Ff	25·10	24·10	25,443	1,013·63	1,005·74	40·07	3·95
6/Ii	20	11·90	12,339	616·95	517·81	25·89	4·20
6/Kk	20	18·58	10,117	505·85	382·88	19·14	3·78
6/Ll	25	20·81	19,424½	776·98	658·18	26·33	3·39
6/Oo	17·58	15·77	15,749	895·84	643·69	36·61	4·09
6/Ss	15·74	13·77	13,700½	870·42	496·35	31·53	3·62
6/Tt	20·74	16·68	14,164½	683·00	579·04	27·92	4·09
6/Uu	24·13	22·18	23,660½	980·54	996·88	41·31	4·21
6/Xx	24·19	22·23	23,400½	967·36	928·89	38·40	3·97
6/Coo	24·58	24·29	17,727½	721·22	777·58	31·63	4·39
6/Ddd	25·23	22·23	15,869½	628·99	672·50	26·65	4·24
6/Jjj	24	22·77	20,341½	847·56	957·63	39·90	4·71
6/Mmm	9	9	9,021	1,002·34	382·38	42·49	4·24
6/Nnn	37	31·48	26,967	728·84	1,075·35	29·06	3·99
Means	21·37	18·54	16,085·82	752·85	657·66	30·78	4·09

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER ,1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during Dec.	Milk. Per Cow during Dec.	Milk. Per Cow March to Dec.	Butterfat. Per Herd during Dec.	Butterfat. Per Cow during Dec.	Butterfat. Per Cow March to Dec.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A	27·84	24·10	14,152½	508·35	4,714·36	696·92	25·03	250·45	4·92
9/B	17·71	16·42	12,323	726·90	4,370·46	541·71	32·00	203·65	4·39
9/C	12	12	8,184	682·00	5,028·87	331·88	27·66	221·15	4·06
9/D	30·68	29·68	21,699½	707·26	5,628·58	1,174·37	38·28	303·54	5·41
9/E	20	18·87	14,726½	736·33	5,261·68	680·35	34·02	250·33	4·62
9/F	20	18·87	11,295	564·75	5,509·26	511·19	25·56	238·68	4·53
9/G	33	32	28,644	868·00	5,204·53	1,327·34	40·22	267·98	4·63
9/H	19·48	19·48	15,992	820·94	7,032·23	720·22	36·97	300·35	4·50
9/I	35·55	35·55	23,165½	651·62	4,139·24	986·04	27·74	171·50	4·26
9/J	60·16	41·65	25,031½	416·08	3,502·92	1,000·74	16·63	144·32	4·00
9/K	24	21·45	9,873½	411·40	3,449·69	521·80	21·74	167·28	5·27
9/L	27·77	17·39	7,414½	266·99	3,588·48	292·90	10·55	140·54	3·95
9/M	19	19	7,827½	411·97	1,816·91	384·64	20·24	82·19	4·91
9/N	31·97	27·61	12,242	382·92	4,606.63	488·27	15·27	188·24	3·99
9/O	25	23·42	13,558	542·32	4,909·13	559·65	22·39	213·89	4·13
9/P	45·97	44·77	20,461	445·06	4,157·14	985·04	21·43	191·55	4·81
9/Q	24·45	22·48	11,322	463·07	3,836·83	515·45	21·08	179·64	4·55
9/R	8	8	6,076	759·50	4,283·83	292·45	36·56	207·74	4·81
9/S	14	13	13,423	958·78	5,408·48	556·26	39·73	232·81	4·14
9/T	24·65	22·87	14,495	588·01	5,169·23	666·55	27·04	237·84	4·60
9/U	15	13·39	6,676½	445·10	3,743·69	365·13	24·34	200·61	5·47
9/V	10	8·03	2,582½	258·25	3,019.90	159·27	15·93	164·10	6·17
9/W	27·71	26·84	19,908	718·44	3,531·86	757·68	27·34	144·12	3·81
Means	24·95	22·47	13,959·70	559·42	4,689·99	631·12	25·29	214·03	4·52

SHOW WHEATS OF 1934.

[By C. E. CHAPMAN, F.I.C., F.A.C.I., Deputy Government Analyst, and A. J. FARQUHAR, A.A.C.I., Chemist, Department of Chemistry.]

Further comparative tests have been made on the 31 Competition Wheats exhibited at the Royal Agricultural and Horticultural Society's Show, 1934, including wholemeal fermentation tests and baking tests. The tests were conducted on exactly similar lines to those conducted on the previous year's competition samples, the results of which were published in this *Journal* (August, 1934). In order that farmers may be able to recognise the wheats which they exhibited, the class number and exhibit number are given.

MOISTURE CONTENT OF WHEATS.

The moisture content of the wheats when received in the laboratory varied from 11.4 to 13.3 per cent., the average being 12.5 per cent. The previous year's samples varied from 12.2 to 14.2 per cent., the average being 13.1 per cent. The lower moisture content of last year's show wheats was probably due to the dry winter experienced.

WHOLEMEAL FERMENTATION TESTS.

These tests were made on the wheat as received, and also on the samples conditioned for milling purposes to 14 per cent. moisture. It was found that it was not practicable to obtain a constant moisture content of 14 per cent. on the wheat ground to the fineness necessary to make the dough test. The first sample that was passed through the mill lost practically no moisture, but subsequent samples, owing to the metal grinding plates of the mill becoming heated in consequence of the work done, lost varying amounts of water. In every instance it was found that the wholemeal contained less moisture than the original wheat. An attempt was made to adjust the moisture of the wholemeal to 14 per cent. moisture by commencing with the moisture of the wheat in excess of 14 per cent. before grinding, but it will be seen on referring to the table below that the wholemeals only roughly approximated to 14 per cent. The moisture of the wheat has a marked influence on the wholemeal fermentation dough test, and unless the moisture is known, the times obtained by the test are of very limited value. The time of the test in every instance increases as the moisture increases.

There is no definite ratio between the percentage increase of moisture of the sample and the percentage increase in the time of the test.

Some of the varieties gave the following results:—

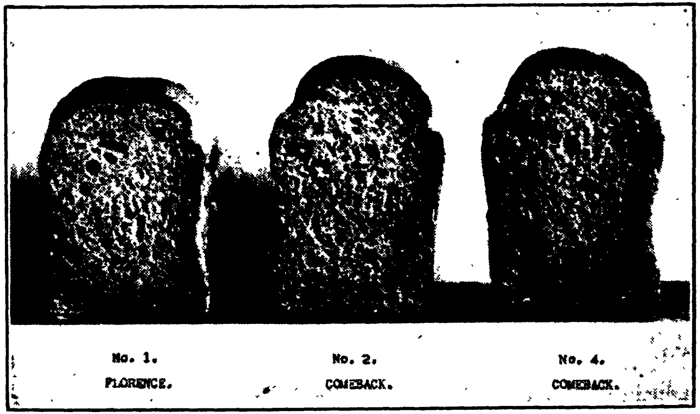
Variety.	Per Cent. Increase of Moisture.	Per Cent. Increase of Time.
Ford	4	21
Ford	7	37
Ford	9	55
Waratah	13	40
Waratah	14	40
Ranee	9	30
Ranee	11	36
Ranee	19	68
S.H.J.	8	32
S.H.J.	14	45
Quality	13	80
Quality	15	97
Comeback	8	39
Comeback	9	48

It is probable that the moisture has some action on the gluten, and probably combines with it to form an hydrated compound. The hydration or hydrolysis apparently takes place slowly, as when varying amounts of water are added to the wholemeal to form the dough the time of the test does not appear to be affected by increasing the quantity of water. In testing freshly harvested wheat in the summer, when the moisture of the grain is usually below 11 per cent., the figures obtained by the test should not be very seriously affected by slight variations of moisture.

The moisture of stored wheat in the winter often rises as high as 14 per cent. and if fermentation dough tests were made on wheat of this moisture content, high test figures would be obtained, which would give rise to an over-estimation of the quality of the wheat. The test is by no means satisfactory when done on high moisture samples, as agreeing results on the same wheat are difficult to obtain. At times the results are erratic and must be repeated many times.

No.	Entry No.	Variety.	Moisture as Received.	Time Test.	Conditioned Wheat, Moisture at Time of Test.	Time Test.
1	10688	Florence	12·1	76	14·0	136
2	10689	Comeback	12·6	129	13·8	191
4	10691	Comeback	13·1	105	14·2	146
3	10690	Quality	12·3	54	13·9	97
6	10693	Quality	12·1	36	13·9	71
8	10695	Minister	12·2	82	13·4	124
5	10692	S.H.J.	12·1	125	13·8	182
7	10694	S.H.J.	11·8	97	14·0	171
9	10696	Pusa	11·4	118	13·6	214
11	10698	Ford	12·8	67	13·7	92
14	10701	Ford	13·3	89	13·9	108
18	10705	Ford	12·6	67	13·8	104
10	10697	Nabawa	13·0	46	13·7	57
15	10702	Nabawa	12·8	54	13·6	62
17	10704	Nabawa	12·3	31	13·7	39
19	10706	Nabawa	12·7	41	13·7	57
12	10699	Bena	12·7	32	14·8	45
13	10700	Ghurka	13·3	25	14·0	31
20	10707	Ranee	12·2	43	13·4	56
24	10711	Ranee	12·1	38	14·4	64
27	10714	Ranee	12·7	33	14·2	45
33	10720	Ranee	12·6	37	13·6	49
16	10703	Gresley	13·1	62	13·7	87
26	10713	White Tuscan	13·1	51	14·3	116
23	10710	Waratah	12·6	32	14·4	45
28	10715	Waratah	12·3	29	14·0	41
25	10712	Sword	13·0	36	14·4	51
29	10716	Currawa	12·9	41	13·9	48
30	10717	Gallipoli	12·4	27	14·0	31
31	10718	Cleostan	12·9	48	13·7	59
32	10719	Late Gluyas	12·2	26	13·6	31

BAKING TESTS.



In determining the baking score, marks are awarded for general appearance, colour of crumb, flavour, texture, and pile, giving 10 points for each characteristic, making a total of 50 points.

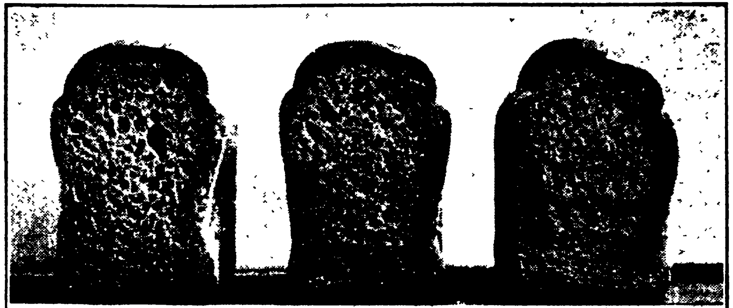
If a baking score of 40 points or more is obtained by a flour it will make a bread of very good quality; a score of below 35 represents poor quality flour.

As the test loaves are made from a weight of flour equivalent to 100 grams of flour of 14 per cent. moisture, *i.e.*, 86 grams of dry flour, the weight of the test loaves multiplied by ten equals the number of two pound loaves which will be obtained from a ton of flour containing 14 per cent. of moisture.

The analyses of the flours and baking tests are given below.

No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
1	3003	10688	Florence	76	42	390	136·9	9·5	10·1	62·0	73·5	Easy
2	3003	10689	Comeback	129	38	470	131·6	9·5	10·1	59·0	74·2	Easy
4	3003	10691	Comeback	105	38	460	133·4	7·9	8·7	61 0	72·3	Easy

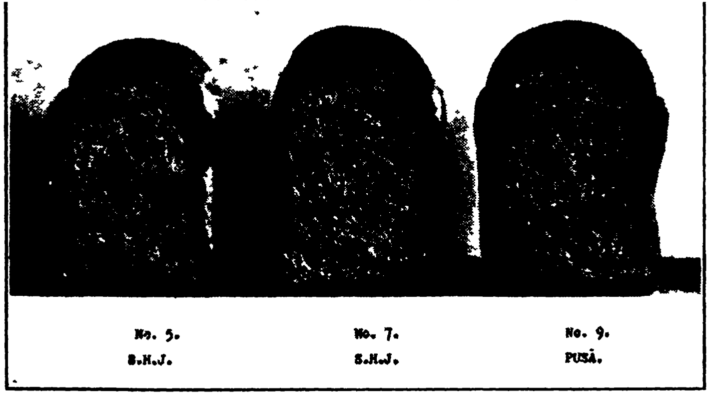
BAKING TESTS—*continued.*



No. 3. QUALITY. No. 6. QUALITY. No. 8 MINISTER.

No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
3	3003	10690	Quality	54	37	440	132·5	10·9	11·2	61·0	75·4	Very easy
6	3004	10693	Quality	36	36	440	130·0	9·5	9·8	61·0	72·8	Easy, slightly greasy
8	3004	10695	Minister	82	39	415	131·2	7·3	7·7	61·0	71·8	Easy

BAKING TESTS—*continued.*

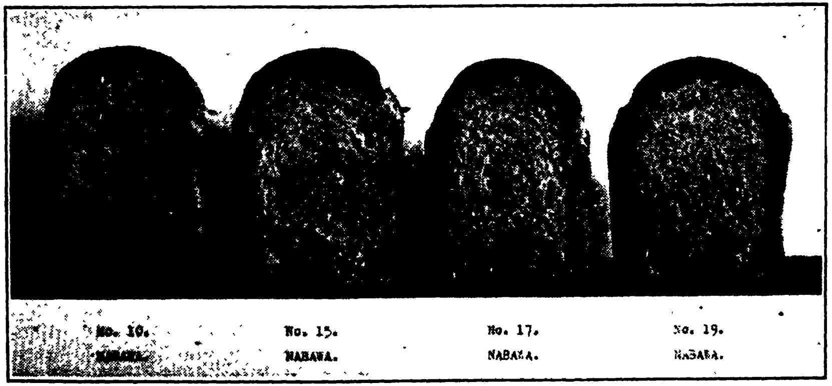


No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
5	3003	10692	S.H.J.	125	36	405	134·1	7 2	7·6	63·0	74·2	Easy
7	3004	10694	S.H.J.	97	40	440	133·1	10·5	10 6	63·0	75·4	Very easy
9	3004	10696	Pusa	118	38	440	137·6	9·8	10·2	70·0	74·2	Fairly hard

BAKING TESTS—*continued.*

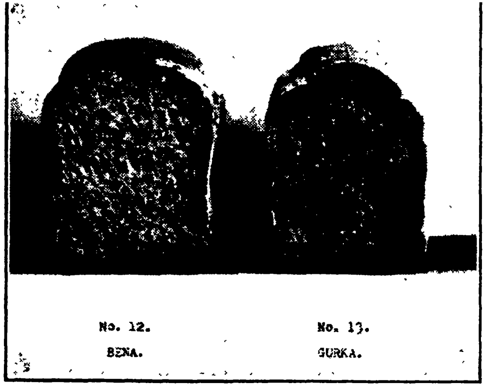
No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
11	3005	10698	Ford	67	38	455	127·4	11·4	11·4	54·0	75·1	Very easy
14	3005	10701	Ford	89	37	435	129·4	6·9	6·9	56·5	74·2	Very easy
18	3006	10705	Ford	67	38	435	127·8	7·9	7·9	54·0	75·2	Very easy

BAKING TESTS—*continued.*



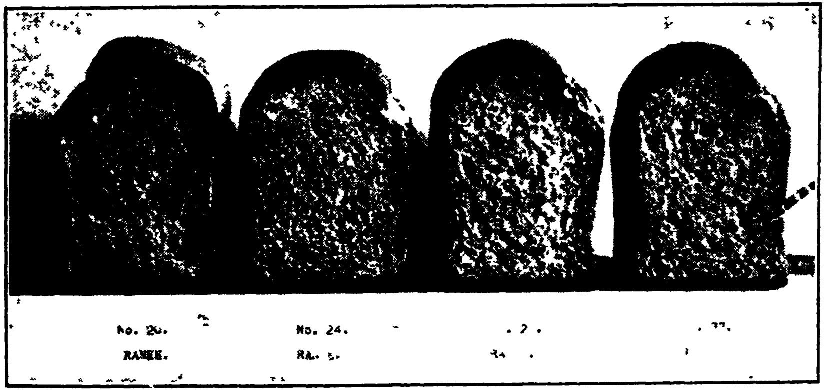
No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
	3005	10697	Nabawa	46	39	385	135·6	7·1	7·4	62·0	73·2	Easy
	3006	10702	Nabawa	54	38	390	131·5	8·5	8·5	57·0	70·5	Fairly easy
	3006	10704	Nabawa	31	33	370	131·4	6·5	6·5	56·0	72·6	Easy
	3006	10706	Nabawa	41	33	370	134·0	8·6	8·8	57·5	71·8	Easy

BAKING TESTS—*continued.*



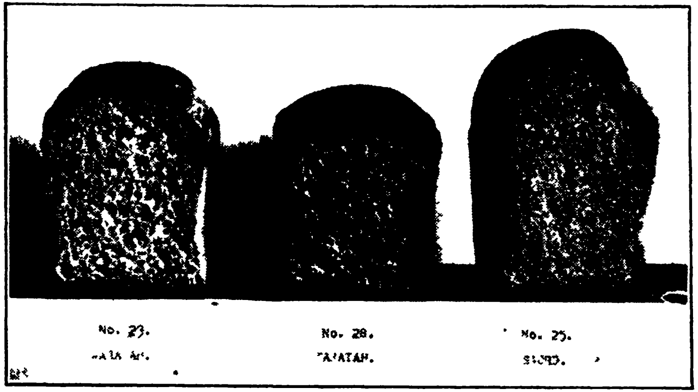
No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5 7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
12	3005	10699	Bena	32	33	380	132·0	8·6	8·7	59·5	70·3	Fairly hard, greasy.
13	3005	10700	Ghurka	25	27	335	131·7	6·3	7·1	57·0	71·9	Easy.
16	3006	10703	Gresley	62	37	420	130·5	7·5	8·0	58·0	72·4	Easy.
26	3007	10713	White Tuscan	51	36	410	128·8	10·0	10·5	55·0	74·8	Very easy

BAKING TESTS—*continued.*



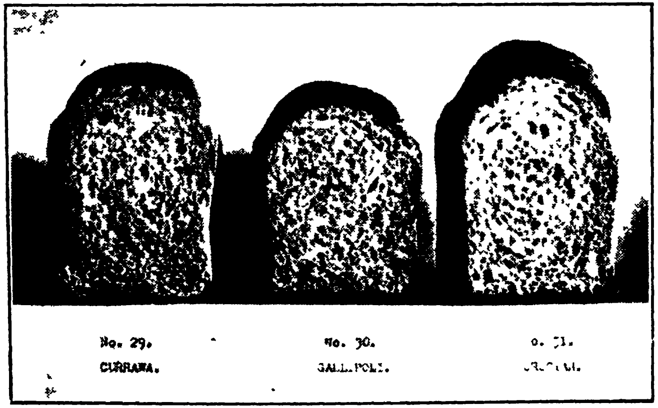
No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
20	3007	10707	Ranee	43	35	405	131·6	8·0	8·1	57·0	73·9	Very easy
24	3007	10711	Ranee	38	35	400	130·2	7·8	8 8	56·0	71·8	Easy
27	3007	10714	Ranee	33	34	420	128·8	5·9	5·9	57·0	73·5	Fairly easy, greasy
33	3008	10720	Ranee	37	34	400	129·2	7·0	7·8	55·0	72·8	Hard, very greasy

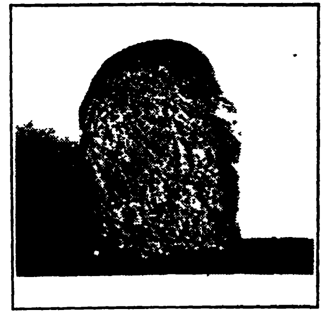
BAKING TESTS—*continued.*



No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
23	3007	10710	Waratah	32	30	380	130 3	8·4	8·4	56·5	73·2	Easy
28	3007	10715	Waratah	29	29	345	128·4	8·8	9·3	55 2	77·1	Easy
25	3007	10712	Sword	36	34	450	128·2	7·6	8·0	55·5	70·9	Fairly easy

BAKING TESTS—*continued.*





No. 32.
LATE GLUYAS.

No.	Class.	Entry No.	Variety.	Wholemeal Fermentation Test Number, as Received.	Baking Score.	Volume of Loaf.	Weight of Loaf.	Flour Dry Gluten.	Flour Protein. (N x 5·7.)	Flour Water Absorption.	Flour Yield.	Ease of Milling.
						ml.	grams.	%	%	%	%	
29	3008	10716	Currawa	41	33	395	127·8	10·5	10 9	54·0	72·3	Easy.
30	3008	10717	Gallipoli	27	31	330	126·2	8·7	8·7	51·0	74·5	Fairly easy.
31	3008	10718	Crostan	48	37	430	125·4	6·4	7·1	52·7	73 4	Very easy.
32	3008	10719	Late Gluyas	26	32	360	129·2	5·8	6·4	53·5	74·6	Easy.

A review of the results of the baking tests shows that the samples of Comeback were not up to the usual high standard of this variety. This also applies to the two Quality wheats, both being of poor flavour, and evidently not true to type. The sample of Florence was characterised by the exceptionally good flavour it gave to the loaf. The S.H.J. wheats differed, No. 7 being the better sample.

The three samples of Ford were similar. No. 14 was low in quantity of gluten, which was partly compensated for by its good physical qualities. It also had a pale crust colour. No. 11 had a rich brown crust, and No. 18 a pale brown crust.

In considering the Nabawas, it was found that No. 10 had rather a high water absorption capacity for this variety, and baked into a good loaf of bread. No. 15 was not so good, whilst the other two can be classed as only medium. These four samples showed plainly the variations which occur on growing the same variety of wheat. Whether it is due to soil and climatic conditions, *i.e.*, environment, or to poorer quality of seed, is not known. It can be said that Nos. 17 and 19 are of too low a grade, and the elimination of these and similar quality wheats would materially improve our f.a.q. standard.

The only sample of Gresley, a new variety being grown in this State, appears to be very promising, and is similar in many respects to the best samples of Ford, from a baking point of view. White Tuscan and Croston are other varieties of which only one has been baked.

The flour obtained from Ghurka showed no improvement on last year's sample, giving a loaf of very poor quality. As regards the Waratah samples, the results obtained in this State agree with those obtained by the Department of Agriculture, New South Wales. They state that "it produced a small, light-brown coloured loaf, with a coarse crumb texture, of light-yellow colour."

Ranee is one of the most widely grown wheats in this State, but all four samples are only of medium quality. The sample of Sword is an improvement compared with last year's samples.

The growing of low grade wheats has been an economic loss to the country. These wheats do not make the palatable bread of former years, the texture is poorer; in some flours the crumb colour is much more yellow, and the bread appears to go stale more quickly. Bleaching and the use of improvers are the means adopted to rectify these faults.

The deficiency and low quality of the gluten have also brought into practice new commercial baking processes whereby portion of the flour is washed away as starch, with the result that those of the public who can afford it, pay roughly 50 per cent. more for the better article.

These samples were made available to the Department of Chemistry by Mr. H. J. Finniss, the Secretary of the Royal Agricultural and Horticultural Society.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on 30th January, 1935, there being present Messrs. H. N. Wicks (Acting Chairman), P. J. Baily, F. Coleman, S. Shepherd, A. M. Dawkins, A. J. A. Koch, Hon. A. L. McEwin, M.L.C., Professor A. J. Perkins (Director of Agriculture), and H. C. Pritchard (Secretary), Apologies were received from Messrs. A. J. Cooke, R. H. Martin, G. Jeffrey, J. W. Sandford, and Dr. A. E. V. Richardson.

Leave of Absence.—The Secretary was instructed to apply for 5 months leave of absence for Mr. Jeffrey, who was on a visit to America.

Change of Place of Upper North Conference.—On the motion of Mr. Dawkins, seconded by Mr. McEwin, the Board agreed to the request of the Wepowie Branch to change the place of the 1935 Upper North Conference from Pekina to Booleroo Centre.

River Murray Swamp Conference.—At the request of the Jervois Branch it was decided that this year's River Murray Swamp Conference should take the form of a Field Day.

Branches to be Closed.—The Board decided to close the Koonibba and Tulkineara Branches.

Life Members.—The honour of Life Membership of the Agricultural Bureau was conferred on the following members:—Messrs. A. M. Fuller (Inman Valey), E. P. Filsell (Lyndoch), J. P. Bagley and D. J. Turvey (Milang), F. W. Lehmann (Murray Bridge).

New Members.—The following names were added to the rolls of existing Branches:—Adelaide—L. G. Ayton, K. O. Ayton, A. R. Ninnes, H. R. Walsh; Balhannah Women's—Miss N. Pitt, Miss J. Kelsey, Miss D. Carr, Mrs. W. W. James, Mrs. A. S. Kelsey, Mrs. H. Nolan, Mrs. F. T. Norsworthy, Mrs. A. Bottroff, Mrs. H. Boehme, Mrs. E. W. Mattner, Mrs. H. A. Spoehr, Mrs. Cooney, Mrs. C. Cox, Mrs. L. Spoehr; Balumba—C. H. Jericho, J. A. Callis; Barmera—W. G. Richards; Blackwood—W. J. Hargreaves; Buchanan—W. G. Marschall; Chandada—J. V. Evans; Gladstone Women's—Mrs. R. Turley, Miss R. Flavel; Hanson—C. Bailey, T. Williams, G. R. Finch, A. T. McWater, M. Humphrys; Inman Valley—T. G. Hodgson, C. Westlake; Koonunga—Walter Hampel; Kybybolite Women's—Miss W. G. Miles; Laura Bay—Wm. McGee; Laura Bay Women's—Miss G. F. W. Lowe—Lone Gum and Monash—F. D. Kuss; Lone Pine—A. Liebich, B. Liebich, E. Pfeiffer, Les. Hoffman, V. Nendner, H. Grossman, H. Kiel; Longwood—A. W. Cameron; Maltee—Owen Peters; McLaren Flat Women's—Miss Hazel Ward, Miss Elsa Foggo; Monarto South Women's—Miss E. Thiele, Miss G. Stevens; Mount Barker—J. Walsh; Mount Compass—H. J. Meyer, A. V. Smith; Mount Gambier—C. R. Kilsby, Wm. B. Johnson; Murray Bridge—F. Douglas, H. S. Kentish, R. Kuchel, A. C. K. Beviss; Mypolonga—J. Hourahan, A. H. Burrett, J. Burrett, D. Haynes, V. Wright; Nantawarra—G. Henderson; O'Loughlin—J. I. Ellis, A. R. Schulz; Owen—Rex Moeller; Paruna—Jas. Petch; Pinbong—J. Coffee; Roberts and Verran—J. W. R. Walton; Sheoak Log Women's—Miss Freda Mattiske, Miss Linda Mattiske, Mrs. W. Nuemann, Mrs. R. Cliff; Tantanoola—F. Seller; Tatiara—V. Killmier; Williamstown Women's—Mrs. D. Coleman; Willowie—G. T. Wood, R. I. Bartlett, M. M. Bartlett; Wirrabara Women's—Mrs. C A. Kranz, Mrs C. M. Kranz, Mrs J. Porter; Yeelanna—Ray Proctor, J. H. Lloyd, K. N. Brinkworth, T. Drummond, H. O. Clements, V. Modra; Monarto South Women's—Mrs. J. Hartmann, Mrs. E. A. Thomas; Wirrabara Women's—Mrs. L. G. Grant, Miss M. L. Jettner, Mrs H. L. Cugley. Miss E. Hicks, Mrs. B. Holland, Mrs. Ray Banfield, Mrs. A. G. Banfield; Hope Forest Women's—Mrs. P. Hailstone; Auburn Women's—Mrs. Linke.

Present number of of members, 7,527; present number of Branches, 340.

Several items were taken in committee.

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.		Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.	
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	190		C. Guthridge, Yundi	49	168	
	2	184			50	189	
	3	29	403		51	162	519
	4	—			52	22	
	5	174			53	67	
	6	136	310		54	116	205
			713				724
A. H. Matthews, Bridgewater	7	139		S. Lambert, Echunga	55	170	
	8	148			56	28	
	9	144	431		57	dead	198
	10	188			58	43	
	11	—			59	133	
	12	45	233		60	125	301
			664				499
G. W. T. Symes, Echunga	13	169		A. Young, Bridgewater	61	99	
	14	28			62	190	
	15	183	380		63	145	434
	16	88			64	179	
	17	150			65	161	
	18	172	410		66	180	520
			790				954
E. B. Gliddon, Yundi	19	176		D. J. Foxwell, Echunga	67	184	
	20	102			68	161	
	21	—	278		69	113	458
	22	dead			70	134	
	23	81			71	127	
	24	66	147		72	43	304
			425				762
T. Cleaver, Bridgewater	25	152		J. C. Normandale, Yundi	73	138	
	26	106			74	180	
	27	104	362		75	166	484
	28	97			76	140	
	29	105			77	136	
	30	153	355		78	148	424
			717				908
J. E. Assender, Echunga	31	139		L. W. Sando, Echunga	79	177	
	32	151			80	dead	
	33	133	423		81	137	314
	34	84			82	187	
	35	111			83	184	
	36	189	384		84	142	513
			807				827
S. Hill, Bridgewater	37	175		J. O. Marshall, Yundi	85	186	
	38	86			86	219	
	39	236	497		87	52	457
	40	156			88	dead	
	41	dead			89	160	
	42	129	285		90	154	314
			782				771
W. Restall, Echunga	43	187		Murray Powell, Jupiter Creek	91	89	
	44	201			92	169	
	45	dead	388		93	168	426
	46	155			94	dead	
	47	146			95	187	
	48	152	453		96	69	256
			841				682

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.		
S. Bridge, Yundi	97	154		
	98	163		
	99	148	465	
	100	121		
	101	dead		
	102	179	300	
				765
C. T. Rodger, Echunga	103	97		
	104	130		
	105	162	389	
	106	173		
	107	179		
	108	dead	352	
				741
R. H. Smith, Yundi	109	38		
	110	22		
	111	201	261	
	112	29		
	113	129		
	114	54	212	
				473
Willow Bend Stud Poultry Farm, North Walkerville	115	43		
	116	111		
	117	161	315	
	118	—		
	119	67		
	120	141	208	
				523
C. MacDonald, Echunga	121	28		
	122	117		
	123	176	321	
	124	176		
	125	144		
	126	106	426	
				747
T. R. Smart Yundi	127	200		
	128	112		
	129	dead	312	
	130	124		
	131	dead		
	132	154	278	
				590
Raymoor Poultry Farm, William Street, Kilkenny	133	78		
	134	156		
	135	162	396	
	136	162		
	137	120		
	138	dead	282	
				678
B. R. Whittington, Yundi	139	92		
	140	139		
	141	227	458	
	142	124		
	143	88		
	144	171	383	
				841
W. A. Haseal, 11, Rosetta Street, Rosewater	145	7		
	146	207		
	147	143	357	
	148	dead		
	149	145		
	150	dead	145	
				502

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.		
H. F. Muirson, Yundi	151	53		
	152	95		
	153	82	230	
	154	68		
	155	133		
	156	122	323	
				553
K. Pennack, Pooraka	157	3		
	158	145		
	159	116	264	
	160	183		
	161	87		
	162	168	438	
				702
C. A. L. Sandstrom, Yundi	163	116		
	164	147		
	165	187	450	
	166	196		
	167	146		
	168	53	395	
				845
G. A. Bielby, Pooraka	169	56		
	170	88		
	171	86	230	
	172	149		
	173	dead		
	174	138	287	
				517
W. M. Field, Yundi	175	145		
	176	136		
	177	170	451	
	178	63		
	179	150		
	180	150	363	
				814
T. Duhring, Mallala	181	195		
	182	210		
	183	150	555	
	184	167		
	185	106		
	186	97	370	
				925
W. R. Hedger Yundi	187	180		
	188	dead		
	189	77	257	
	190	97		
	191	206		
	192	dead	303	
				560
A. & H. Gurr, Bradbury	193	164		
	194	178		
	195	120	462	
	196	186		
	197	193		
	198	188	567	
				1,029
J. V. McGinnis, Yundi	199	182		
	200	90		
	201	130	402	
	202	121		
	203	145		
	204	22	288	
				690

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.		
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	197		
	206	60		
	207	197	554	
	208	110		
	209	136		
	210	186	432	
				986
W. C. Jones, Yundi	211	8		
	212	106		
	213	194	308	
	214	118		
	215	161		
	216	62	341	
				649
Langmaid & Bettison, Parafield, Salisbury	217	dead		
	218	124		
	219	68	192	
	220	123		
	221	138		
	222	148	409	
				601
A. Jarvis, Yundi	223	71		
	224	127		
	225	73	271	
	226	147		
	227	125		
	228	190	462	
				733
S. Eyles, Clarendon	229	75		
	230	dead		
	231	152	227	
	232	153		
	233	191		
	234	147	491	
				718
Woodbury Poultry Farm, Stirling East	235	109		
	236	17		
	237	166	292	
	238	dead		
	239	64		
	240	95	159	
				451
V. F. Gameau, Findon Road, Woodville	241	72		
	242	6		
	243	126	204	
	244	dead		
	245	96		
	246	133	229	
				433
Geo. Lomax, Yundi	247	148		
	248	33		
	249	137	318	
	250	dead		
	251	dead		
	252	69	69	
				387
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	153		
	254	206		
	255	60	419	
	256	21		
	257	12		
	258	29	62	
				481
W. R. Williams, 28, Avenue Road, Frewville	259	214		
	260	82		
	261	dead	300	
	262	139		
	263	203		
	264	201	543	
				843
R. W. McAllister, Yundi	265	80		
	266	115		
	267	161	356	
	268	94		
	269	190		
	270	114	398	
				754
G. W. Sykes, Yundi	271	69		
	272	76		
	273	138	283	
	274	183		
	275	176		
	276	122	483	
				766
A. P. Urlwin, Balaklava	277	194		
	278	161		
	279	174		
		533		
A. V. Dupen, Melton Street, Glenelg	280	179		
	281	206		
	282	130		
		515		
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	108		
	284	198		
	285	150		
		451		
Thomas & Elson, Clifton Street, Hawthorn	286	144		
	287	78		
	288	143		
		365		
J. H. Dowling, Glossop, River Murray	289	119		
	290	185		
	291	172		
		476		
E. Pape, Wynarka	292	dead		
	293	27		
	294	132		
		159		
L. S. Ekers, Mount Jagged Farm, Mount Compass	295	161		
	296	142		
	297	156		
		459		
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	180		
	299	188		
	300	195		
		563		
L. R. Badcock, 77, Findon Road, Woodville	301	104		
	302	87		
	303	129		
		320		

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	127	
	305	175	
	306	202	
		504	
Gallagher & Aslin, Pooraka	307	181	
	308	167	
	309	154	
		502	
R. C. Crittenden, William Street, Kilkenny North	310	185	
	311	159	
	312	81	
		425	
C. H. Lines, Junr., Gladstone	313	143	
	314	174	
	315	179	
		496	
A. J. Monkhouse Woodside	316	176	
	317	90	
	318	63	
		329	
B. Cooke, Kanmantoo	319	207	
	320	216	
	321	198	
		621	
Total Class 1. ...		38,881	

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.	
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	78	
	323	5	
	324	91	
		174	
G. Frisby Smith, Fulham (Minorcas)	325	—	
	326	dead	
	327	151	
		151	
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	95	
	329	177	
	330	136	
		408	
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	83	
	332	195	
	333	134	
		412	
Total Class No. 2		1,145	

Class 3.—*Black Orpington.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.	
H. J. Mills, 108, Edward Street Edwardstown	334	190	
	335	94	
	336	87	471
	337	156	
	338	204	
	339	242	602
			1,073
A. G. Dawes Portrush Road, Glenunga Gardens	340	194	
	341	131	
	342	190	515
	343	156	
	344	135	
	345	161	452
			967
Willow Bend Stud Poutry Farm, North Walkerville	346	198	
	347	182	
	348	156	536
	349	160	
	350	67	
	351	93	320
			856
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	139	
	353	137	
	354	155	431
	355	101	
	356	191	
	357	148	440
			871
A C. Byrne, 114, Rose Terrace, Wayville West	358	139	
	359	134	
	360	113	386
	361	133	
	362	94	
	363	120	347
			733
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	129	
	366	127	
		296	
C. H. Lines, jun. Gladstone	367	157	
	368	109	
	369	dead	
		266	
J. H. Dowling, Glossop, River Murray	370	83	
	371	127	
	372	dead	
		210	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	162	
	374	163	
	375	173	
		498	
Mrs. M. Specht, Holder Avenue, Richmond	376	186	
	377	169	
	378	162	
		517	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	119	
	380	165	
	381	88	
		372	
G. Frisby Smith, Fulham House, Fulham	382	156	
	383	33	
	384	104	
		293	
B. Cooke, Kanmantoo	385	207	
	386	172	
	387	168	
		547	
Total Class No. 3.			7,499

EGG-LAYING COMPETITION—*Continued.*

Class No. 4.—Any other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive to Feb. 9th, 1935.	Totals
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	131	
	389	155	
	390	90	376
	391	157	
	392	119	
	393	162	438
			814
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	141	
	395	186	
	396	202	529
	397	165	
	398	55	
	399	154	374
			903
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400	79	
	401	124	
	402	192	
		395	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	123	
	404	140	
	405	177	
		440	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	71	
	407	179	
	408	169	
		412	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	142	
	410	124	
	411	131	
		397	
K. Pennack, Pooraka (Barnevelders.)	412	176	
	413	157	
	414	185	
		518	
Total Class No. 4.		3,879	

Class No. 5—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive to Feb. 9th, 1935.	Totals
A. O. Dawkins, Gawler	415	161	
	416	158	
	417	84	403
	418	174	
	419	198	
	420	176	548
			951
A. V. Dupen, Melton Street, Glenelg	421	56	
	422	dead	
	423	187	
		243	
A. J. Monkhouse, Woodside	424	193	
	425	161	
	426	182	
		536	
Total Class No. 5.		1,730	

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive to Feb. 9th, 1955.	Totals
A. C. Byrne, 114, Rose Terrace, Wayville West	427	108	
	428	119	
	429	141	368
	430	92	
	431	149	
	432	165	406
			774
G. Frisby Smith, Fulham House, Fulham	433	178	
	434	117	
	435	120	
		415	
Total Class No. 7.			1,189

Home Project Utility Section.—Wet Mash.

Competitor.	Bird No.	First Grade Eggs.
John Plummer, Virginia School	436	166
Dudley Harper, Murray Bridge School	437	96
Jack Beauchamp, Murray Bridge School	438	130
Jack Beauchamp, Murray Bridge School	439	112
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	215
Stanley Pratt, Abattoirs School	442	186
Mervyn Steer, Sturt School	443	166
Donald Welford, Westbourne Park School	444	149
E. Zbierski, Gawler School	445	dead
J. McInerney, Gawler School	446	85
F. Martin, Gawler School	447	201
Darcy Coleman, Mallala School	448	162
Kevin Angus, Mallala School	449	69
Alwin Scott, Wellington Road School	450	163
Jack Dietman, Wellington Road School	451	124
Milton Smith, Salisbury School	452	183
Owen Robinson, Ascot Park School	453	146
Paul Mundy, Urrbrae High School	454	124

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to Feb. 9th, 1935.
Max Couche, Thebarton School	455	200
Robert Swift, Murray Bridge School	456	209
Bruce Dooland, Thebarton Central School	457	23
Ian Slee, Two Wells School	470	150
Total		3,059

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

SECTION 2.—DRY MASH.

Home Project Utility Section.

F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	3	227
	459	6	203
	460	5	199
		14	629
		23	1,127

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Class No. 4.

G. W. Lindsay, Torrens Road, Kilkenny (Langshans.)	461	—	45
	462	3	87
	463	4	171
		7	303

Competitor.	Bird No.	First Grade Eggs.	Progressive Totals to Feb. 9th, 1935.
Class No. 1.			
Gallagher & Aslin, Pooraka	464	3	149
	465	4	182
	466	—	167
		7	498

The above birds are White Leghorns and, together with Nos. 307 and 309, will constitute a team in this class.

W. C. Slape, Magill	467	4	134
	468	4	162
	469	dead	—
		8	296
Class No. 2.			
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	—	26
	472	—	135
	473	1	167
		1	328
Class No. 1.			
Willow Bend, Stud Poultry Farm, North Walkerville	474	4	205
	475	—	7
	476	5	189
		9	401
	477	2	161
	478	4	209
	479	4	205
		10	575
		19	976
Willow Bend, Stud Poultry Farm, North Walkerville	480	—	184
	481	5	169
	482	5	202
		10	555
	483	3	108
	484	—	163
	485	5	182
		8	453
		18	1,008

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED FEBRUARY 2ND, 1935.—*FIRST GRADE EGGS ONLY.*

SECTION 1.—WET MASH.

Class 1.—*White Leghorns.*

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	236	39
B. R. Whittington	227	141
J. O. Marshall	219	86
Trios—		
B. Cooke	621	319–321
Willow Bend Stud Poultry Farm	575	477–479
A. & H. Gurr	567	196–198

Teams—		
A. & H. Gurr	1,029	193–198
Gallagher & Aslin	1,000	307–309 and 464–466
A. G. Dawes	986	205–210

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	195	332
V. F. Gameau (Minorca)	177	329
Langmaid & Bettison (Minorca)	167	473
Trios—		
A. Heaysman (Cuckoo Leghorns)	412	331–333
V. F. Gameau (Minorcas)	408	328–330
Langmaid & Bettison (Minorcas)	328	471–473

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	242	339
F. F. Welford	227	458
B. Cooke	207	385
Trios—		
F. F. Welford	629	458–460
H. J. Mills	602	337–339
Willow Bend Stud Poultry Farm	555	480–482
Teams—		
F. F. Welford	1,127	373–375 and 458–460
H. J. Mills	1,073	334–339
Willow Bend Stud Poultry Farm	1,008	480–485

Class 4.—Any other Heavy Breeds.

All Rhode Island Reds.

Singles—		
A. G. Dawes	202	396
E. F. Snow	192	402
K. Pennack (Barnevelders)	185	414
Trios—		
A. G. Dawes	529	394–396
K. Pennack (Barnevelders)	518	412–414
A. G. Dawes	438	391–393
Teams—		
A. G. Dawes	903	394–399
A. G. Dawes	814	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—		
A. O. Dawkins	198	419
A. J. Monkhouse	193	424
A. V. Dupen	187	423
Trios—		
A. O. Dawkins	548	418–420
A. J. Monkhouse	536	424–426
Teams—		
A. O. Dawkins	951	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	178	433
A. C. Byrne	165	432
A. C. Byrne	149	431

Trios—		
G. Frisby Smith	459	433–435
A. C. Byrne	406	430–432
Teams—		
A. C. Byrne	774	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Eric Pratt, Abattoirs (White Leghorn)	215	441
Robert Swift, Murray Bridge (Black Orpington)	209	456
F. Martin, Gawler (White Leghorn)	201	447
Max Couche, Thebarton (Rhode Island Red)	200	455
Stanley Pratt, Abattoirs (White Leghorn)	186	442

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to January 31st, 1935.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to Dec. 31st, 1935.	No. Eggs Laid Month of Jan., 1935.	Total Eggs Laid April 1st, 1933, to Jan. 31st, 1935.
No. 1 test	12,777	596	13,373
No. 2 test	11,925	483	12,408
No. 3 test	11,551	508	12,059
No. 4 test	12,771	487	13,258
No. 5 test	6,711	279	6,990

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on 1st February, 1935:—

BUTTER.—Trade in produce during January was more or less spasmodic, for at the beginning of the month traders had hardly got into stride after the holidays and in some instances were carrying stocks. In butter, however, there was a steady demand, and a greater quantity of factory butter was sold because of the lessened supplies of dairy butter available. Under the new Government plan of equalisation the local rates were unaltered, but it is pleasing to report that London values have shown a firming and the outlook is more promising than has been the case for many months past. Production is steadily declining in this State, and importations of choicest butter are now necessary from Victoria. Local values at present are:—Choicest creamery fresh butter, in bulk, 1s. 3¼d. per lb.; prints and delivery extra; store butter, 6d. to 8d. per lb., according to quality; separator lines, from 9d. to 1s. 1d. per lb. for choicest. These prices are subject to equalisation levies.

CHEESE.—The South-Eastern factories kept the markets nicely supplied and a steady trade was carried on with Western Australia. An improved demand was experienced for matured cheese and stocks are now considerably reduced. Present rates are:—Large and medium, from 8d. per lb.; loaf, from 8½d. per lb. at store door, delivery extra; semi-matured and matured, 8½d. to 9d. per lb.

EGGS.—As is usual at this time of the year production is declining, but the falling away is greater than was expected. However, there are more than sufficient for local needs, and until better outlets are obtainable in the eastern States rates will remain steady and at present are:—Ordinary country eggs, fair average quality, 4d. per dozen net; long distance rail or shipping eggs, lower; selected new laid clean eggs, 1⅞ozs. and over, 6d. to 6½d. per dozen net.

BACON.—Average sales were made from week to week and values continued on an even keel at:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 8½d. to 9d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 3d. to 1s. 4d. per lb.

ALMONDS.—Only limited supplies were marketed throughout the month under review and were satisfactorily cleared. Merchants are now awaiting consignments of the new crop, which is reported to be only a moderate one, and, in the meantime, values are without change, being:—Softshells and Brandis, 9d. to 9½d. per lb.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 11½d. to 2s. 0½d. per lb.

HONEY.—Sales are still dull and there was no alteration in quotations, although concessions were given by some sellers to effect quittance. Rates are:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades, 1d. to 2d. per lb.

BEESWAX.—Continued in good request, and all consignments met with ready sale at 1s. 4d. to 1s. 4½d., according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday and our salerooms are the best equipped in the State. As is usual after the Christmas markets supplies were somewhat short, more especially of heavyweight table birds, although there were considerable quantities of White Leghorn hens marketed each week. As poulterers are now short of stocks, the demand is likely to remain strong. We advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 4s. 6d. to 5s. 6d.; nice conditioned cockerels, 3s. 6d. to 4s. 3d.; fair conditioned cockerels, 2s. 3d. to 3s. 4d.; chickens, lower; heavyweight hens, 2s. to 2s. 10d.; medium hens, 1s. 5d. to 1s. 9d.; light hens, 1s. to 1s. 4d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 4s. to 5s.; young Muscovy ducks, 2s. 3d. to 3s.; ordinary ducks, 1s. 3d. to 2s.; ducklings, lower; geese, 2s. 6d. to 3s. 6d.; goslings, lower; turkeys, good to prime condition, 8½d. to 11d. per lb. live weight; turkeys, fair condition, 6d. to 8d. per lb. live weight; turkeys, poor and crooked breasted, lower; pigeons, 4½d. to 5d. each.

POTATOES.—New season's, 10s. 6d. per cwt.

ONIONS.—New season's, 9s. 6d. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of January, 1935, for the year 1935, also the average precipitation for January, and the average annual rainfall.

Station.	For Jan. 1935.	Av'ge. for Jan.	Total Rain for 1934.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0·95	0·55	2·66	4·66
Marree	0·75	0·39	3·29	5·88
Farina	0·82	0·48	3·29	6·43
Copley	0·49	0·53	6·77	7·87
Beltana	0·31	0·64	7·72	8·48
Blinman	0·20	0·89	8·57	11·86
Hookina	0·63	0·45	9·20	11·25
Hawker	0·68	0·56	10·36	12·26
Wilson	0·82	0·57	10·89	11·79
Gordon	0·57	0·58	7·94	10·53
Quorn	0·65	0·63	9·74	13·22
Port Augusta	1·50	0·51	6·66	9·44
Bruce	0·76	0·43	7·15	9·87
Hammond	0·90	0·58	6·62	11·21
Wilmington	0·81	0·78	14·56	17·32
Willowie	0·93	0·45	11·24	12·25
Melrose	1·33	1·13	20·45	22·88
Booleroo Centre	1·06	0·74	14·93	15·21
Port Germein	1·43	0·60	12·56	12·53
Wirrabara	1·63	0·69	16·73	19·29
Appila	1·56	0·61	15·32	14·65
Cradock	0·54	0·58	8·83	10·82
Carrieton	0·55	0·72	10·39	12·23
Johnburg	0·42	0·56	9·60	10·58
Eurelia	0·56	0·73	10·84	12·79
Orroroo	1·00	0·93	13·68	13·20
Naokara	0·16	0·66	10·66	11 09
Black Rock	0·53	0·67	10·89	12·37
Oodlawirra	0·56	0·58	11·44	11·68
Peterborough	0·76	0·78	13·43	13·22
Yongala	0·85	0·64	13·96	14·44
North-East.				
Yunta	0·12	0·59	5·22	8·55
Waukaringa	0·20	0·47	5·57	7·94
Mannahill	0·24	0·61	6·16	8·20
Cockburn	0·22	0·57	5·64	7·96
Broken Hill, N.S.W.	0·09	0·64	6·82	9·50
Lower North.				
Port Pirie	1·91	0·59	11·80	13·21
Port Broughton	1·58	0·56	12·49	13·88
Bute	1·31	0·54	14·09	15·44
Laura	1·54	0·69	19·04	17·95
Caltowie	1·38	0·67	18·03	16·74
Jamestown	1·12	0·66	19·45	17·69
Gladstone	1·95	0·64	17·95	16·29
Crystal Brook	2·16	0·64	14·52	15·78
Georgetown	1·89	0·65	13·40	18·37
Narridy	1·79	0·52	12·88	15·82
Redhill	2·14	0·54	13·83	16·59
Spalding	1·72	0·59	14·40	18·88
Gulnare	1·76	0·62	15·68	18·68
Yacka	1·87	0·48	14·65	15·39
Koolunga	1·89	0·57	12·37	15·38
Snowtown	1·06	0·57	13·30	15·74

Station.	For Jan. 1935.	Av'ge. for Jan.	Total Rain for 1934.	Av'ge. Annual Rainfall.
Lower North—*continued*.				
Brinkworth	1·95	0·49	12·89	15·82
Blyth	1·95	0·66	13·79	16·78
Clare	1·84	0·86	19·70	24·51
Mintaro	1·50	0·62	20·75	23·42
Watervale	1·99	0·88	23·58	26·80
Auburn	1·40	0·94	22·83	23·98
Hoyleton	1·15	0·71	14·58	17·33
Balaklava	1·06	0·66	13·98	15·46
Port Wakefield	0·88	0·54	11·97	12·94
Terowie	0·62	0·69	13·20	13·35
Yarcowie	0·65	0·67	12·83	13·59
Hallett	1·48	0·68	13·84	16·46
Mount Bryan	1·76	0·56	14·61	16·83
Kooringa	1·08	0·71	14·25	17·85
Farrell's Flat	1·16	0·70	14·61	18·61
West of Murray Range.				
Manoora	1·45	0·60	19·91	18·92
Saddleworth	1·22	0·73	19·10	19·60
Marrabel	1·06	0·72	19·91	19·96
Riverton	0·93	0·74	20·11	20·81
Tarlee	0·88	0·74	17·38	18·10
Stockport	0·74	0·71	18·58	16·93
Hamley Bridge	0·71	0·74	15·12	16·54
Kapunda	0·78	0·83	17·61	19·71
Freeling	1·10	0·73	15·66	17·83
Greenock	0·93	0·77	18·30	21·53
Truro	0·76	0·70	14·55	19·89
Stockwell	0·66	0·69	15·59	20·13
Nuriootpa	0·94	0·77	18·78	20·72
Angaston	0·77	0·77	16·83	22·42
Tanunda	1·18	0·84	17·16	22·02
Lyndoch	1·00	0·75	17·22	23·40
Williamstown	0·97	0·91	19·36	27·77
Adelaide Plains.				
Owen	0·96	0·43	14·52	14·66
Mallala	0·71	0·68	13·12	16·56
Roseworthy	0·99	0·70	18·14	17·40
Gawler	0·93	0·71	14·78	18·91
Two Wells	1·06	0·64	16·57	15·75
Virginia	1·20	0·67	18·27	17·18
Smithfield	1·28	0·52	18·06	17·64
Salisbury	1·03	0·69	18·18	18·56
Adelaide	0·78	0·72	20·24	21·15
Glen Osmond	0·98	0·89	22·79	26·05
Magill	1·04	0·83	18·78	25·53
Mount Lofty Ranges.				
Teatree Gully	1·32	0·81	22·65	27·20
Stirling West	1·76	1·49	40·23	47·08
Uraidla	2·00	1·31	33·69	44·19
Clarendon	1·26	1·07	26·78	32·88
Happy Val'y Res.	0·78	—	—	—
Morphett Vale	0·69	0·74	19·48	22·66
Noarlunga	0·69	0·59	17·71	20·37
Willunga	0·59	0·76	22·31	26·02
Aldinga	0·45	0·55	17·80	20·27

RAINFALL—*continued.*

Station.	For Jan. 1935.	Av'ge. for Jan.	Total Rain for 1934.	Av'ge. Annual Rain-fall.
Mount Lofty Ranges—*continued.*				
Myponga	0·68	0·68	27·78	29·50
Inman Valley	0·65	—	17·54	20·68
Yankalilla	0·42	0·56	20·72	22·83
Mount Pleasant	0·77	0·87	20·15	27·23
Birdwood	1·27	1·00	22·74	29·21
Gumeracha	1·19	1·07	27·06	33·41
Millbrook Res.	1·57	1·13	30·80	34·68
Tweedvale	1·32	1·02	32·18	35·99
Woodside	1·35	0·98	23·92	32·31
Ambleside	1·33	1·06	27·88	34·90
Nairne	1·34	0·96	23·24	28·22
Mount Barker	1·19	1·02	25·85	31·31
Echunga	1·15	1·05	30·44	33·30
Macclesfield	0·79	0·89	26·20	30·43
Meadows	0·77	1·03	29·44	36·16
Strathalbyn	0 61	0·69	19·49	19·31
Murray Flats and Valley				
Meningie	0·69	0·61	14·49	18·37
Milang	0·37	0·59	14·17	14·91
Langhorne's Ck.	0·69	0·46	16·59	14·87
Wellington	0·79	0·70	14·55	14·65
Tailem Bend	0·83	0·53	15·12	15·06
Murray Bridge	0·53	0·55	11·44	13·56
Callington	0·45	0·66	13·30	15·19
Mannum	0·42	0·50	10·67	11·49
Palmer	0·31	0·57	14·17	15·63
Sedan	0·19	0·57	8·70	12·11
Swan Reach	0·51	0·44	10·95	10·64
Blanchetown	0·30	0·67	11·03	11·01
Eudunda	0·89	0·67	16·15	17·17
Pt. Pass	0·96	0·47	—	—
Sutherlands	0·49	0·38	9·80	10·84
Morgan	0·32	0·49	8·31	9·17
Waikerie	0·39	0·36	9·99	9·65
Overland Corner	0·58	0·48	6·71	10·32
Loxton	0·59	0·52	10·54	11·54
Berri	0·84	0·44	9·35	10·17
Renmark	0·58	0·46	8·77	10·41
West of Spencer's Gulf				
Eucla	0·23	0·58	13·39	9·96
Nullarbor	0·09	0·35	10·69	8·81
Fowler's Bay	0·35	0·36	10·40	11·94
Penong	0·39	0·29	10·57	12·27
Koonibba	0·29	0·28	11·08	12·13
Denial Bay	0·23	0·21	9·68	11·36
Ceduna	0·24	0·21	11·43	10·16
Smoky Bay	0·12	0·24	8·44	10·53
Wirrulla	0·89	0·13	10·18	10·54
Streaky Bay	0·22	0·39	12·89	14·88
Chandada	0·34	—	9·98	—
Minnipa	0·58	0·55	10·96	14·06
Kyancutta	0·61	—	10·32	—
Talia	—	0·24	10·32	14·76
Port Elliston	0·59	0·36	14·86	16·54
Lock	0·21	0·41	—	—
Mount Hope	0·38	—	—	—
Yeelanna	0·69	0·22	15·93	15·94
Cummins	0·26	0·35	17·36	17·60
Port Lincoln	0·19	0·55	15·94	19·42
Tumby	0·30	0·29	17·70	14·12
Ungarra	0·74	0·31	18·10	16·85
Port Neil	0·34	0·31	13·52	13·09

Station.	For Jan. 1935.	Av'ge. for Jan.	Total Rain for 1934.	Av'ge. Annual Rain-fall.
West of Spencer's Gulf—*continued.*				
Arno Bay	0·44	0·37	14·31	12·65
Rudall	0·36	0·45	12·87	12·64
Cleve	0·49	0·49	17·40	14·83
Cowell	0·66	0·44	11·28	11·07
Miltalie	1·15	0·50	15·22	13·67
Mangulo	0·71	0·45	—	—
Darke's Peak	0·76	0·52	13·06	15·18
Kimba	1·32	0·29	9·74	11·82
Yorke Peninsula.				
Wallaroo	1·25	0·52	13·32	13·98
Kadina	1·10	0·49	13·24	15·64
Moonta	0·94	0·49	15·13	15·06
Paskeville	0·74	0·46	14·74	15·49
Maitland	1·35	0·59	16·93	19·90
Ardrossan	0·82	0·47	13·06	13·97
Port Victoria	0·53	0·44	13·59	15·44
Curramulka	0·45	0·55	15·16	17·87
Minlaton	0·34	0·49	14·83	17·79
Port Vincent	0·39	0·38	12·98	14·43
Brentwood	0·31	0·34	14·89	15·55
Stansbury	0·36	0·54	16·33	16·82
Warooka	0·27	0·42	14·64	17·49
Yorketown	0·36	0·45	13·92	16·88
Edithburgh	0·38	0·48	16·17	16·37
South and South-East.				
Cape Borda	0·34	0·58	23·45	24·82
Kingscote	0·18	0·44	20·68	19·14
Penneshaw	0·30	0·42	20·83	18·92
Victor Harbour	0·38	0·67	22·75	21·37
Port Elliot	0·41	0·64	21·15	19·93
Goolwa	0·43	0·64	18·95	17·85
Maggea	0·53	0·58	—	—
Copeville	0·58	0·42	11·97	11·51
Claypans	0·62	0·68	—	—
Meribah	0·67	0·56	10·52	11·31
Alawoona	0·38	0·61	10·54	10·36
Caliph	0·29	—	—	—
Mindarie	0·50	0·54	12·67	12·21
Sandalwood	0·58	0·62	13·26	13·66
Karoonda	0·82	0·47	10·90	14·36
Pinnaroo	0·56	0·43	12·48	14·43
Parilla	0·40	0·42	11·57	13·82
Lameroo	0·48	0·53	12·59	15·97
Parrakie	0·77	0·42	12·98	14·62
Geranium	1·00	0·44	12·56	16·51
Peake	0·79	0·55	13·93	16·01
Cooke's Plains	0·61	0·52	14·48	15·30
Coomandook	0·66	0·48	15·35	17·09
Coonalpyn	0·73	0·74	17·72	17·61
Tintinara	0·97	0·47	17·23	18·71
Keith	0·49	0·42	18·33	17·92
Bordertown	1·35	0·70	15·78	19·21
Wolseley	0·93	0·58	17·56	18·49
Frances	0·52	0·66	18·58	20·11
Naracoorte	1·09	0·78	20·78	22·66
Penola	1·02	1·01	22·51	26·01
Lucindale	1·03	0·69	25·78	23·34
Kingston	0·86	0·71	21·62	24·28
Robe	0·96	0·77	22·85	24·67
Beachport	1·04	0·83	25·34	27·09
Millicent	1·24	0·94	31·78	29·79
Kalangadoo	1·36	1·16	30·85	32·28
Mount Gambier	1·14	1·32	24·85	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. Feb.	Dates of Meetings. Mar.
Monarto South Women's	†	16	16
Moorlands	*	—	—
Morchard	*	22	22
Morchard Women's	*	27	27
Mount Barker	*	18	18
Mount Bryan	*	—	—
Mount Compass	*	—	—
Mount Gambier	†	8	8
Mount Hope	*	R	19
Mount Pleasant	*	8	8
Mudamuckla	*	9	9
Mundalla	*	—	—
Mundalla Women's	*	21	21
Murray Bridge	*	—	—
Murraytown	*	—	—
Mypolonga	*	—	—
Myponga	*	21	21
Myrla	*	13	20
Nantawarra	*	14	14
Naracoorte	*	9	9
Narridy	*	—	—
Narrung	*	—	—
Nelshaby	*	—	—
Nelshaby Women's	*	—	—
Netherton	*	13	20
Nunjikompita	*	14	14
Nunkeri	*	14	14
O'Loughlin	*	11	11
O'Loughlin Women's	*	—	—
Overland Corner	*	13	20
Owen	*	11	11
Palabie	*	—	—
Parilla	*	19	19
Parilla Women's	*	20	20
Parilla Well	*	18	18
Parilla Well Women's	*	26	26
Parrakie	*	—	—
Parrakie Women's	*	26	26
Paruna	*	1	1
Paskeville	*	12	19
Pata	*	1	1
Penola	908	2	2
Penola Women's	*	—	—
Penwortham	*	13	20
Petersville	*	12	19
Petina	*	23	23
Pinbong	*	—	—
Pinnaroo	*	—	—
Pinnaroo Women's	*	15	22
Port Elliot	*	—	—
Pygery	*	12	19
Pygery Women's	*	—	—
Quorn	*	—	—
Ramco	*	18	18
Redhill	*	—	—
Rendelsham	*	16	16
Rendelsham Women's	*	—	—
Renmark	*	—	—
Riverton	*	11	11
[redacted]erts and Verran	*	—	—
[redacted]	*	—	—
[redacted]	*	—	—
[redacted]	*	12	16
Saddleworth	*	15	22
Saddleworth Women's	*	5	5
Scott's Bottom	*	16	—
Sheoak Log Women's	*	—	16
Shoal Bay	*	12	19
Smoky Bay	*	—	—
Snowtown	*	8	8
Snowtown Women's	*	R	7
South Kilkerran	*	12	19
Springton	*	6	6
Stanley Flat	*	18	18
Stockport	*	—	—
Strathalbyn	*	13	13
Streaky Bay	*	22	22
Sutherlands	*	—	—
Talia	*	22	29
Tantanoola	†	2	2
Tantanoola Women's	*	6	6
Taplan	*	R	19
Taplan Women's	*	—	—
Taragoro	*	14	14
Tarlee	*	—	—
Tatiara	*	—	—
Tintinara	*	—	—
Truro	*	18	18
Tweedvale	*	21	21
Ungarra	*	21	21
Upper Wakefield	*	—	—
Uraidla and Summerton	*	4	4
Waddikee Rocks	*	16	16
Waikerie	*	8	8
Wallala	*	R	13
Wanbi	*	27	27
Wandearah	*	12	19
Warcowie	*	12	19
Warcowie Women's	*	—	—
Warramboo	*	12	19
Warramboo Women's	*	R	—
Wasleys	*	14	14
Wasleys Women's	*	7	7
Watervale	*	18	18
Waurultee	*	12	19
Weavers	*	11	11
Wepowie	*	18	18
Wepowie Women's	*	—	—
Wilkawatt Women's	*	—	19
Williamstown Women's	*	6	6
Willowie	*	25	25
Wilmington	*	12	12
Wilmington Women's	*	—	—
Wirrabara	*	—	—
Wirrabara Women's	†	—	—
Wirrilla	*	14	28
Wirrilla Women's	*	14	14
Wirrulla	*	20	20
Wolseley	*	11	11
Wudinna	*	—	—
Yadnarie	*	12	19
Yandiah	*	8	8
Yaninee	*	—	—
Yeelanna	*	13	20
Yundi	*	20	20
Yurgo	*	—	—
Yurgo Women's	†	—	—

[redacted] during the month of January † Held over.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SOUTH-EASTERN DISTRICT.

PENOLA (Average annual rainfall, 26.01in.).
December 14th.—Attendance, 27.

The meeting took the form of a debate on the subject "Horses *verses* Power Farming" between members from the Coonawarra and Penola Branches. The Coonawarra team which consisted of Messrs. E. Gaffney (leader), J. Kain, and W. L. Redman, debated in favour of horses. The claims of power farming were supported by Messrs. S. Ockley (leader), W. Clifford, and C. Provis of the Penola Branch. The Reverend A. McNaughton, who adjudicated, gave his decision in favour of the Penola team. (Secretary, F. Hinze.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mount Gambier.	11/1/35	11	"Dairy Industry in South-East," W. H. Downes	G. Gurry

UPPER NORTH DISTRICT.
(PETERBOROUGH AND NORTHWARD.)

APPILA (Average annual rainfall, 14.65in.).
1st February.—Attendance: 12.

HARVEST REPORTS.—Despite a rather trying year for all cereal crops, returns in the Appila district have been generally satisfactory. Members reported the following yields:—Nabawa, 24bush.; Sultan, 24bush.; Currawa, 24bush.; German Wonder, 24bush.; Sword, Waratah, and Aussie, 17bush.; Ranee, 18bush.; Crostan and Canaan, 15bush.; Early African, 20bush.; Minister, 12bush.; Free Gallipoli, 17bush.; Noongar, 14bush.; Fondling, 11bush.; Sepoy, 14bush.; Ghurka, 16bush.; Turvey, 15bush.; Daphne, 13bush. Oats, 18bush., and barley, 30bush. (Secretary, E. H. Wurst.)

MIDDLE NORTH DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Narridy	2/2/35	7	Harvest Reports	J. Klingner

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

KOONUNGA.

January 16th.—Attendance: 16.

In the course of an address, "Fruit Drying," Mr. B. Boehm, of the Light's Pass Branch, said that in order to obtain a good sample of dried fruit the fruit should be picked whilst it was firm. It should then be left in the case for at least one day, or until it had become ripe. Fruit treated in that manner was not likely to become squashy, such fruit having a tendency to dry out into "slabs." Other subjects dealt with by Mr. Boehm included sulphuring and dipping operations. Concluding his address, Mr. Boehm stressed the fact that as the bulk of the State's dried fruit had to be sent overseas it was most important that every fruitgrower should aim at marketing a product of the highest quality. (Secretary, H. Mibus.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Greenock	21/1/35	27	Address—B. H. Teusner .	A. Schubert
Light's Pass ...	14/1/35	22	Question Box	C. Verrall
Blyth..........	11/1/35	10	Forthcoming Conference .	R. Eime
Penwortham ...	24/10/34	14	Address—Mr. Guster	A. Jenner
Penwortham ...	27/11/34	11	Congress Reports	A. Jenner
Greenock	16/12/34	11	"A grain of wheat," C. Laucke	A. Schubert

WESTERN DISTRICT.

LAURA BAY.

November 13th.—Attendance, 19.

HOBBIES.—Under the title "Hobbies for Winter Evenings and Wet Days on the Farm," the following paper was read by Mr. W. Bowell:—"Perhaps one of the best is carpentry, it is interesting and profitable, and many useful articles can be made. Petrol cases can be made into settees, bottle drainers, cupboards, and shelves for the pantry. Leather work is another good hobby. Perhaps the hobby that can be turned to best use is that of blacksmithing, because so much can be done to keep down repair bills. If it becomes necessary to do repairs that one does not feel capable of doing satisfactorily, the best plan is to take the job to the local tradesman and watch him do the work. Next time it can be done at home. If a lathe is included in the equipment it can be turned to profitable account. Chip carving and fret work will also help to while away many hours during long evenings in winter." (Secretary, P. Morrison.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Koppio	12/11/34	10	Conference Reports......	M. Gardner
Koppio	18/12/34	7	Discussion	M. Gardner

SOUTH AND HILLS DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Hartley	19/12/34	8	Vegetable Growing, W. Yeates	W. Brook
Yundi	19/12/34	—	"Gardening," Mr. Jones	T. Smart
Scott's Bottom .	17/11/34	9	Paper from *Journal*	E. Atkinson
Scott's Bottom .	19/1/35	9	Discussion	E. Atkinson
Yundi	16/1/35	16	Address—E. W. Pritchard	T. Smart
Blackheath	24/1/35	8	Question Box	E. Paech

WOMEN'S BRANCHES.

LAURA BAY,—January 8th.

HOUSEHOLD HINTS.—Paper read by Mrs. R. W. Burke, Hon. Secretary:—When making starch, try whisking a candle in the liquid for a few seconds while the starch is very hot. When the articles are ironed after being starched in this manner, they should have a nice glossy finish. Do not destroy old gramophone discs, use them in place of beeswax to keep the iron smooth and clean. Cover the disc with a cloth before using. Fine wire, rolled into a ball makes a good pot-cleaner. To keep pots and pans from getting black when used over an open fire, rub them over with a greasy cloth before use. When they are washed the black comes off easily. A lemon heated in the oven or before the fire, will yield twice as much juice as when cold. An orange is also improved if treated in the same manner. When making fruit or meat pies, place two or more wooden skewers across the pie-dish. They will keep the pastry from falling into the dish. If changing the covers of pillows, mattresses, etc., open the case containing the feathers or kapoc about 9in., have the new cover sewn with a 9in. opening left to correspond, then tack the two openings together and gently work the filling into the new case.

MANGALO (Average annual rainfall, 14in. to 15in.).
November 21st.—Attendance: 11.

HOME DRESSMAKING.—Mrs. J. Hissey read the following paper:—"In addition to being an interesting and pleasing pastime, dressmaking can be the means of saving many pounds, especially if there is a young family to provide with clothes. Many garments can be made for a few pence each, and clothes that have been used by the adults can be unpicked and re-made for the children. Knickers can be made for small boys from the bottoms of men's flannel trousers, and singlets and shirts can also be refashioned for the children. Before cutting out a garment always place the pattern against the figure; measure the hips, bust and length, and leave ½in. to allow for turnings all round, except the hem, which is cut to the required length. Be careful to place the pattern centre front, straight down the fold of the material, and when making up a figured design, see that the design runs the same way. Do not cut 2 pieces for one side, nor 2 sleeves for one arm; cut one, and then lay it on the material with the two right sides together, thus making a pair. Never tack a garment without first pinning it and fitting it on. The pins can be easily removed to take up a seam, and any alterations can be made by moving the pins. If turnings are first pressed with a warm iron they lie flat, and are easier to handle. When making up a dress, first sew the shoulder dart and then shoulder seams, measure the waist and join the skirt. Then do the side seams from armhole to hem, measure length all round, and bind hem. See that the sleeves are exact, and place at the required notch, then the collar, overcasting, and press well. Trimming and buttons can be put on where desired." Reports of the Annual Congress were given by Mesdames Hannemann and Turner. (Secretary, Mrs. B. Coles.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kybybolite	18/12/34	14	Paper from *Journal*	Mrs. W. Keckwick
Kybybolite	15/1/35	120	Address—S. Shepherd ...	Mrs. W. Keckwick
Wilkawatt	18/12/34	9	Annual Meeting	Mrs. W. Pritchard
Hope Forest and Dingabledinga	3/1/35	27	Social	Mrs. L. Fincher
Gladstone	18/12/34	27	Cake Icing, Mr. Masters .	Mrs. L. Sargent
Gladstone	15/1/35	35	Address—Dr. Stewart ...	Mrs. L. Sargent
Wasleys	6/12/34	17	Congress Reports	Miss J. Braun
Williamstown...	5/12/34	10	Congress Reports	Mrs. A. Cundy
Clare	5/1/35	26	Uses of Lemons, Mrs. W. Miller	Mrs. H. Pollock
McLaren Flat...	7/2/35	20	Social Afternoon	Miss I. Nicolle
Snowtown......	2/2/35	15	Visit to Clare Branch ...	Mrs. A. Hocking
Sheoak Log	7/2/35	28	Address—Miss E. Campbell	Miss K. Koch

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. MARCH 15, 1935. No. 8.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

South-East (Lower), at Mount Gambier, Wednesday, April 10th (G. T. Gurry), Secretary).

River Murray, at Moorook, Thursday, June 20th (S Perkins, Secretary).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Argentine Wheat Position.

An outline of the operations of the Argentine Grain Control Board, which was established by the Government in November, 1933, appeared in our April, 1934, issue. The object of this Board was to extend assistance to wheatgrowers. Under the plan the Government would, in short, establish basic prices from time to time for produce dealt with (wheat, linseed, and maize), and would purchase at those prices all produce submitted to it, afterwards reselling it for export only, in accordance with the prices prevailing on the world's markets. The Exchange Control Commission would establish the rate at which the banks should purchase exporters' bills. The exchange made available in this way would be sold daily to the highest bidders, and any resulting difference would meet losses incurred in the grain operations of the Control Board, and also expenses.

Up to 28th November, writes Mr. W. J. Jackman, of Buenos Aires and quoting from an official statement, the Board has sold 3,776,329 metric tons, having still on hand a remnant of 167,153 tons. Below is a statement of the handlings and stocks month by month:—

Months.	Purchases. Tons.	Sales. Tons.	Cancellations. Tons.	Stocks, End of Month. Tons.
December . ..	571,450	28,171	3,039	540,240
January	1,512,653	477,153	7,437	1,568,303
February	927,356	295,802	2,505	2,195,352
March	423,577	475,039	2,927	2,140,963
April	392,578	159,712	4,252	2,369,577
May	174,253	1,154,796	5,785	1,383,249
June	10,112	140,154	19,504	1,233,703
July	635	355,722	13,604	865,012
August	146	103,765	7,961	753,431
September . ..	20	191,647	1,518	560,286
October	—	181,117	115	379,054
November	1,350	213,251	—	167,153

The total expenses of the Board amounted to $8,814,942 paper pesos, of which $2,455,000 was interest on money borrowed for the purpose of its operations, and $714,000 general expenses. These costs and expenses are, of course, more than covered by the profits on the purchase and sale of exchange bills received in payment for the exported grain, and there still remains on hand a balance of $43,000,000 pesos, which it is announced will be used by the Board for its operations with the new crop.

The report mentions that it had been originally estimated that there would be a loss of 50 millions on the operations of the Board, but the situation was completely changed by the rise in prices following the drought in the United States.

The Minister of Agriculture announces that the Grain Control Board will continue its functions, and will buy grain of the new crop at the same basic rates as last year, viz., $5.75 for wheat, $4.40 for maize, and $11.50 for linseed.

Enforcement of Stock Brands Act.

A resolution of the Kyancutta Conference requesting a more stringent enforcement of the provisions of the Brands Act was placed before the Registrar of Brands, who has supplied the following information:—

"Should any person illegally or wrongfully brand sheep or earmark same contrary to the Brands Act, it should be at once reported to the nearest police officer, who, in turn, will advise this department, and the necessary action will be taken.

"Before a person can rebrand his sheep, it is necessary for him first to obtain permission from this department. Where brands are placed on the wrong position, or are indistinct, blotched, or smudged, if information is given to this department in this connection, steps will be at once taken to investigate.

"Sheep earmarks can now be registered, the near ear being reserved for ewes and the off ear for wethers or rams. The opposite ear, *i.e.*, off ear of ewes and near ear of wethers, is reserved, so that the owner of a sheep brand may use any private earmark he desires, provided he does not exceed the size ½in. by ¾in.

"All marks, with the exception of a slit, must be made with a pair of pliers.

"Inspectors of stock and temporary Inspectors appointed under the Stock Diseases Act, 1888, are Inspectors of Brands, also all Inspectors of Police."

Blackberry Control.

Replying to an inquiry from Longwood, Mr. A. G. Strickland (Deputy Chief Horticultural Instructor) states that for successful control of blackberries it would seem that either grubbing or slashing is an indispensable preliminary operation, except perhaps in the case of isolated infestations.

After slashing or grubbing, other plant species, such as subterranean clover, may be sown (together with super), in order to provide a measure of plant competition. The patches should be heavily grazed by goats, cattle, or sheep, in such a manner as to ensure damage by grazing and trampling of new blackberry shoots. This method constitutes a long range project, but has given fairly successful results in certain parts of Victoria.

Where infestations are small and scattered, chemical sprays may be used—such as arsenite of soda or chlorates. After the first spraying, new growth may be resprayed at the required intervals, or, if preferred, the dead material resulting from the first spraying may be piled on the new blackberry growth and burned. Less spray will be required if the patches are all given a preliminary slashing, the crowns swabbed or sprayed, and all new growth similarly treated at intervals as required.

In the case of widespread blackberry invasion, the use of chemical sprays would be expensive and difficult, and in all probability the slower method of slashing and heavy grazing, combined with efforts to establish other plants, such as subterranean clover, would be preferable.

This summary is based on information supplied by the Weeds Research Officer of the Victorian Department of Agriculture.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"Aldinga" asks for a drench for control of parasitism in sheep.

Reply—The following drench has given very good results, but it is suggested that it be given a trial on a few sheep in order to see the effects:—

Drench for Sheep.—Copper sulphate, 1lb.; "Black Leaf 40," 13½ fluid ounces; water, 1gall.

Doses.—Lambs, 3 to 6 months, ½oz.; lambs, 6 to 12 months, 1oz.; sheep, 2-tooth, 1½ozs.; sheep (over these ages), 2ozs. Repeat doses in 3 weeks.

In drenching sheep, it is not necessary to starve them either before or after giving the drench. No drench is 100 per cent. effective against parasitism in sheep and it is very necessary where symptoms of the disease are present that better nourishment be provided.

"Sutherlands" reports mares off feed, legs wide apart, head hanging down and turned towards the belly.

Reply—The symptoms described are those of impaction of the bowels due either to accumulation of food or sand. The treatment indicated is:—

Give the following drench:—Raw linseed oil, 1·1½ pints; oil of turpentine, 4 tablespoonfuls. Mix and shake well before administration. Four hours after the above drench has been given administer the following medicine:—Take aromatic spirits of ammonia, spirits of nitrous aether, of each 3ozs.

Directions.—Give 2 to 4 tablespoonfuls mixed in one pint of cold water and a cup of treacle. This should be repeated every four hours, and every two hours enemas of warm water should be injected into the top back passage taking care that the bowel is not injured by the syringe or piece of rubber. If possible inject 3 or 4galls. If no improvement the following morning, repeat the oil drench and follow by the spirits drench. It is most important to administer the drenches and enemas until normal bowel action is established. Signs of recovery are return of appetite for food and water.

"Andrews" asks cure for 2 mares with split hooves.

Reply—A horizontal groove about 1in. long (deep, but not so deep as to draw blood) should be cut and burned in the hoof just at the upper extremity of the crack, so as to prevent any further extension of it in an upward direction. The crack itself should be thoroughly cleaned out and its bearing on the shoe "eased." The hoof should be dressed all over daily with a little of the following dressing:—Oil of tar, 1 part; oil of turpentine, 1 part; fish oil, 4 parts.

THE CHAMPIONSHIP WHEAT CROP COMPETITION.

(Won by Mr. P. McD. Smyth, Salter's Springs.)

In his report on the Championship Wheat Crop Competition for the 1934-35 season, Mr. R. C. Scott (Supervisor of Experimental Work), who judged the entries, states that Wheat Crop Competitions supervised by the Department of Agriculture have been conducted in South Australia during the past 10 years.

For the first six seasons financial assistance was given by the Government, but unfortunately in 1931 and 1932 it was found necessary to discontinue the granting of this subsidy. However, in the following year a generous donation by the South Australian Farmers' Co-operative Union Limited materially assisted in the success of these competitions, whilst in the present season the Government subsidy was renewed. The help thus given has been a very big factor in maintaining interest in the crop competitions during the period of depression and the low price of wheat.

The past season has been most abnormal so far as the development of wheat crops is concerned. Until the end of July the rain registered in practically all districts was very much below the average. From August onwards the weather conditions improved, and satisfactory falls were recorded, with the result that many crops were permitted to make full recovery.

However, in the lower rainfall areas the winter check was too severe to permit this, and crop competitions in the Murray Mallee and Eyre's Peninsula districts suffered accordingly.

Over the balance of the State really good crops matured, whilst an excellent sample of grain developed, but unfortunately before harvest was complete this good quality was militated against by unseasonable weather, which delayed reaping, and ultimately an average grain sample much inferior to that originally anticipated was secured. However, throughout the State the crops were particularly free from disease, and only in exceptional cases could any appreciable reduction in yield be attributed to this cause.

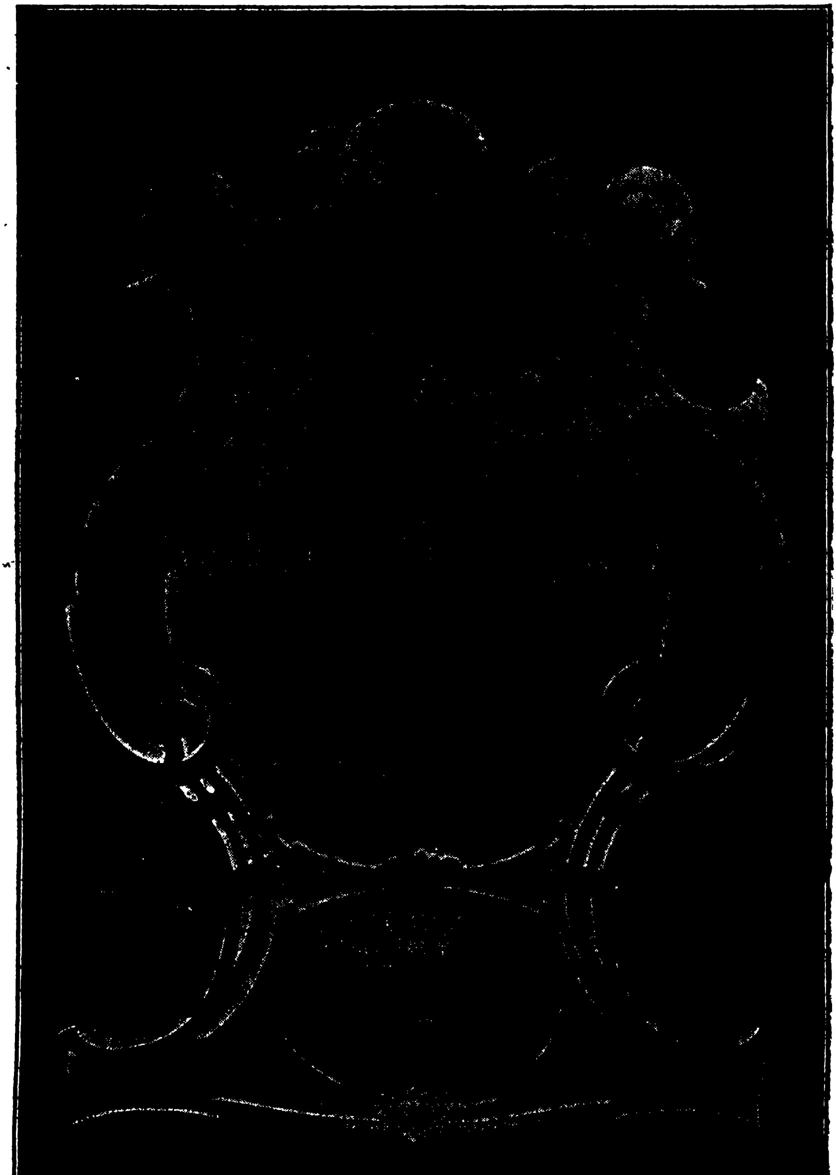
In all, 18 districts conducted competitions, and the number of crops exhibited totalled 328. The Department of Agriculture appointed the judges, who made the awards and issued reports on all crops entered. In four of the districts the judges decided that the winning crop was not sufficiently good to leave in the Championship, and therefore only 14 crops took part in this competition.

Table Showing Progress of Wheat Crop Competitions.

Year.	Districts Conducting Competitions.	Number of Crops Exhibited.
1924	12	290
1925	13	248
1926	17	444
1927	19	525
1928	22	634
1929	21	520
1930	19	473
1931	16	352
1932	20	385
1933	19	351
1934	18	328

In 1927 the Royal Agricultural and Horticultural Society offered as a prize in connection with Wheat Crop Competitions conducted under the auspices of the Department of Agriculture a silver challenge shield of the value of 50 guineas, and annually a small replica of the shield valued at 5 guineas.

The Royal Society desired specially to encourage the Wheat Crop Competitions, and in accepting the generous offer the Government agreed to the conditions laid down by the Society, which were as follows:—



1. The prizes go to the person exhibiting the best crop in the Competitions supervised by the Department of Agriculture, the silver challenge shield to be held for a period of 12 months immediately succeeding the award, and the silver replica to become the absolute property of the winner.

2. The challenge shield, with the name of each year's winner engraved thereon, to be exhibited in the town hall or institute nearest the farm on which the winning crop was grown.

3. The crop awarded first prize in each supervised district competition to be taken as an entry for the Championship Competition, except in any case in which it is thought by the judge of the district competition that the winning crop is not of sufficient merit to warrant inspection for the championship trophy.

4. All entries for the championship to be inspected by one judge. Such inspection to be undertaken in each district soon after the district judge has made his awards, but not before the crop has ripened.

5. Each competitor for the Championship to be required to stage one bag of grain and one sheaf (about 1ft. in diameter) of grain in the straw at the Royal Spring Show following the competition.

WINNERS OF THE CHAMPIONSHIP WHEAT CROP.

1927. F. V. Trenorden, Bordertown. (Federation wheat.)
1928. F. Coleman, Saddleworth. (Leak's Rustproof and Fondling wheats.)
1929. F. V. Trenorden, Bordertown. (Bena wheat.)
1930. H. C. M. Pilgrim, Wolseley. (Gallipoli wheat.)
1931. A. M. Dawkins, Gawler River. (Ford wheat.)
1932. J. P. Carrigg, Hamley Bridge. (Sword wheat.)
1933. H. Michael, Hilltown. (Dan wheat.)
1934. P. McD. Smyth, Salter's Springs. (Sword wheat.)

THE ENTRIES.

Of the 14 crops included in the Championship Crop Competition, 9 were of the Sword variety, and 1 each of Ford, Gallipoli, Gluyas, Nabawa, and Pine Head wheats. They were all well grown and of high competition standard, well worthy of exhibition in such a competition. However, the crops submitted from the lower rainfall districts showed evidence of the difficult winter conditions experienced, and the apparent yield was not as great as that from those in the more favoured areas.

In all cases, the filling of the ears and the quality of the grain was really good, but in some of the Sword crops quite an appreciable quantity of grain had shaken out.

The standard of farming set by the men responsible for the planting of these crops was excellent, and worthy of general adoption throughout the districts concerned.

THE AWARDS.

In reporting on the entries, it has been decided to follow the practice of other years of indicating the crops which have been placed second and third to the winner of the championship trophy, but with other crops the exhibitors' names are placed in alphabetical order, and not according to points awarded.

The awards and a brief description of the crops submitted in the competition are set out below:—

THE CHAMPIONSHIP WHEAT CROP (SWORD WHEAT).

P. McD. Smyth, Salter's Springs.

The crop which was successful in gaining the championship was that grown by Mr. P. McD. Smyth, at Salter's Springs, a good wheat-growing area, about 7 miles in a westerly direction from Riverton.

This was an excellent crop of Sword wheat, and had been awarded first prize in the Midlands District Competition.

It was wonderfully dense, regular, and well headed, and despite the fact that the rough weather of 17th December had led to the loss of several bushels of wheat to the acre, the grain yield promised to be particularly heavy.

Very few weeds were present, only an occasional plant of charlock, nancy, and slender thistle being seen, whilst, except for a little take-all on the rising ground near the south-western corner, the crop was practically free from disease.

So far as purity is concerned, it was the best crop of Sword judged, there being very few brown chaffed plants in evidence, although the variations of type common to all except the latest selections of this variety were present.

The field had been carefully seeded, and very little land missed.

The crop was sown on an area which in the past had been worked on a three-course rotation, namely, pasture, bare fallow, wheat.

The block was ploughed in March, 1933, harrowed in July, cultivated in August, followed by a good tillage throughout, and finally sown in the first week of June with 80lbs. of Sword wheat, together with 150lbs. of 45-grade superphosphate to the acre.

It was obvious that the whole of the operations associated with the preparation of the land and the seeding of the field were most efficiently carried out, and the crop which resulted not only reflected considerable credit on Mr. Smyth as an agriculturist, but also created very favourable comment from all who had the pleasure of inspecting it.

THE OTHER PLACED CROPS.

A. H. Wolf, Rosedale (Pine Head).

The crop placed second in the Championship was that grown by Mr. A. H. Wolf, at Rosedale, about 10 miles to the north-east of Gawler. This magnificent crop gained first position in the Central Competition, and promised to be the highest yielder of all those entered in the major competition.

The plants were exceptionally well headed, and the crop was very thick, whilst an excellent sample of grain had developd. Weeds were not plentiful, isolated plants of slender thistle, geranium and narrow-leafed clover being the only ones present.

A little disease in the way of take-all, flag smut, and rust was found, but the latter was not sufficiently plentiful to affect the filling of the grain.

The variety, Pine Head, is a selection made by Mr. Wolf. Its parents are not known, but the wheat possesses some Gluyas characteristics, and probably originated from that variety. At present it is somewhat unfixed in type, varying considerably in rate of maturity, colour of straw, and class of ear, but is a prolific wheat, well worthy of further selection.

On account of the hilly nature of the field, there were a few drill misses. The land was farmed on an oats, fallow, wheat rotation. The fallow was broken in July, cultivated in October, and after the usual tillage sown in the middle of May with 85lbs. of 45-grade super, together with 75lbs. of graded and dry-pickled seed wheat.

This was an excellent commercial crop, but from a competition point of view was affected by the unfixed nature of the wheat variety utilised.

W. H. Watkins, Yeelana (Gluyas).

The County Flinders Crop Competition was won by Mr. W. H. Watkins, at Yeelanna, and this crop of Gluyas wheat was awarded third position in the Championship.

It was well grown and well headed, but had lodged a little, and some damage had been caused by grasshoppers.

The crop was particularly free from weeds, only a few plants of Cape weed being present. Except for a little rust on some later maturing plants, no disease was found.

The variety was not quite pure, containing a sprinkling of plants carrying white chaffed ears, whilst bearded plants were also present.

Only one fairly large patch had been missed by the drill, and, generally speaking, the evenness of the crop was satisfactory. The cropping rotation of the field since 1929 had been fallow, wheat, barley, pasture, fallow. The land was ploughed in July, harrowed, and cultivated four times, including the tillage given at seeding, and drilled with 70lbs. of Gluyas wheat, together with 120lbs. of superphosphate per acre. This was an excellent competition crop, practically free from weeds, and showing evidence of sound farming methods.

OTHER ENTRIES (IN ALPHABETICAL ORDER).

L. S. & R. J. BEINKE, Kimba (Sword).

The crop submitted by Messrs. L. S. & R. J. Beinke was successful in winning the County Buxton Competition, and when the seasonal conditions are taken into consideration, the entry must be regarded as very creditable to the men concerned.

Sword wheat was planted on somewhat variable land, and on the lighter soil the yield was lower than on the better type country, whilst grasshoppers had caused appreciable damage on the later ripening patches. The chief weeds were charlock, slender thistle, brome grass, and wild oats, whilst there was a fair amount of take-all. There was a considerable admixture of brown-eared wheat, resembling Waratah, together with the usual variation in ear characteristics associated with the Sword variety. Prior to being fallowed in 1933, the land had lain out as pasture for two seasons. It was ploughed in July with a mouldboard plough, cultivated in September, February, and March, and 70lbs. of Sword wheat and 45lbs. of superphosphate combined in during the second week in June.

JAS. CAMPBELL, Barabba (Sword).

This crop was awarded the premier position in the Balaklava Crop Competition. It was an excellent competition crop, except for the fact that the character of the season had caused a reduction in the average yield comparatively with that which would have been harvested had normal weather conditions prevailed.

It was difficult to find any weeds, the crop being particularly clean in this respect, and the only disease present was a few isolated plants affected with hay die. A few brown chaffed wheat plants showed up, but practically no land was missed in the seeding operations, and everything pointed to the fact that very efficient farming methods had been adopted by Mr. Campbell.

The cropping rotation practised on the competition field was pasture, bare fallow, wheat, and after the land had been ploughed in July it was harrowed three times, then cultivated in September, October, and March before 104lbs. of 45-grade super and 63lbs. of Sword wheat were combined in to the acre early in June.

L. Y. LANGDON, Kongal, Bordertown (Gallipoli).

This crop was placed first in the Tatiara Crop Competition, and consisted of 50 acres of Gallipoli wheat, which had made good, dense growth and headed well. It was fairly clean, the weeds present being scattered plants of slender thistle, nancy, silver grass, sheepweed, and horehound. On the other hand, there was a good deal of take-all throughout the crop, together with a fair amount of rust, but the latter disease had not had a serious effect upon the filling of the grain.

The variety was very clean and true to type, only a few white chaffed plants and an occasional bearded wheat being present. Care had been taken in the seeding operations, but a few strips had been missed by the drill. Before being prepared

for this crop, the land had been under grass for four years. It was ploughed in August, harrowed four times, and cultivated twice, prior to the combining in of 114lbs. of superphosphate and 79lbs. of Gallipoli wheat in early July.

G. E. & H. M. Meier, Paskeville (Sword).

This entry of Sword wheat had won the Northern Yorke Peninsula Competition. It was a well-headed, even crop, which was tending to lodge and shake a little grain. The latter was very well filled, and of high weight per bushel.

Weeds were not plentiful, consisting chiefly of isolated charlock, sheep weed, wild oat, and poppy plants.

The crop was relatively free from disease, a little take-all and a light infection of red rust being the only ones present, although grasshoppers had stripped much of the flag and a few ears from the plants. The usual impurities and strain variations found in the majority of crops of Sword wheat were in evidence. The crop was even, and very little land had been missed in the seeding operations. It was planted on fallow land, which had been preceded by a fallow-wheat-barley rotation.

The first tillage took place early in April, 1933, when the soil was worked over the combine. It was ploughed in August, cultivated in September, and harrowed three times during the course of the season, whilst 90lbs. of 45-grade superphosphate and 65lbs. of Sword wheat were planted to the acre by means of a combine in June.

J. L. Noonan, Abbeville (Sword).

This was a really good and attractive crop, which had been awarded first prize against keen opposition in the Mid-Northern Competition. It was a wonderfully dense and even field of wheat, with the plants carrying well-developed ears, each of which held full plump grain.

In places, weeds were rather plentiful, particularly patches of mustard, with a little nancy and wild oats.

In connection with disease, there was a little ball smut, with an odd spot of red rust, and a few plants affected with flag smut. There was a fair amount of land missed at seeding, particularly at the corners, thus affecting the evenness.

Throughout the crop there was a sprinkling of brown chaffed wheat plants and the type variations of Sword wheat.

The land had been worked on a bare fallow-wheat rotation. It was fallowed in July, cultivated in September, and after preparatory tillage, seeded with 75lbs. of Sword wheat, together with 75lbs. of 45-grade superphosphate per acre.

A. Piggott, Morchard (Ford).

This crop of Ford wheat, which won the Far Northern Crop Competition, was particularly clean, and, except for an odd plant of charlock and Salvation Jane, was free from weeds.

An excellent sample of grain had developed on well-headed, disease-free plants. There was a light sprinkling of brown chaffed wheat, but the variety was really good for trueness to type. There were no drill misses, and the crop was quite satisfactory as regards evenness. This was an excellent competition crop, and, despite the unfavourable winter weather, promised to yield well.

The land had been worked on a wheat, fallow, wheat, pasture, fallow rotation, and in preparation for this crop the field was ploughed in July, cultivated twice during the season, and, together with the usual seeding tillage, planted with 60lbs. of Ford wheat and 62lbs. of 45-grade superphosphate to the acre.

H. POLKINGHORNE, Minlaton (Sword).

Although this crop of Sword had been damaged by hail, it was still a good field of wheat, and had won first prize in the Southern Yorke Peninsula Competition. It was fairly clean, except for patches of wild oats, with scattered plants of hog weed, charlock, poppy and sand rocket.

The only disease doing damage was a little take-all, whilst the purple-strawed strain of Sword was affected with rust. The crop was only fair regarding trueness to type, containing some bearded wheat and a little Pryor barley.

Except for a few strips missed at seeding, the crop was regular.

The field had been farmed on a barley, bare fallow, wheat rotation, and for the competition crop had been fallowed in July, 1933, and after thorough tillage throughout the year, planted with 75lbs. of Sword wheat, together with 1cwt. of 45-grade superphosphate to the acre.

J. RZESZKOWSKI AND MATTNER BROS., Finniss (Sword).

The first prize in the Southern District Crop Competition was won by this crop of Sword wheat, and although a little thinner in places, it was a really good competition crop, promising a high yield of good quality grain.

Wild oats were rather plentiful, and other weeds consisted of cockspur, milk thistle, slender thistle, and mustard.

The crop was free from disease, except for a little rust, but some grain had shaken out from the ears. It was much truer to type than most crops of Sword, and only a light sprinkling of brown chaffed wheat was in evidence.

The crop had been carefully seeded, and very little land was missed. The field utilised was fallowed in July, 1933, and maintained in a good condition of tilth until planted with 60lbs. of Sword wheat and 100lbs. of superphosphate in the following June.

E. STUBING, Yadnarie, Cleve (Sword).

The County Jervois Crop Competition was won by Mr. E. Stubing with this crop of Sword wheat, which, considering the character of the season, had developed particularly well, and promised quite a satisfactory yield of plump, well-filled grain.

It was very free from weeds, only an occasional plant of charlock, dandelion, &c., being seen, whilst, except for a few patches of take-all, no other disease was noticed.

There was the usual admixture of brown chaffed wheat, common to the older strains of Sword. The crop had been carefully drilled, and only a few patches had been missed at seeding.

The land had been fallowed in July by means of a disc plough, harrowed in August, ploughed back with the disc in September, cultivated in October, and again in February. Seeding took place during the third week of May, when 65lbs. of Sword and 90lbs. of 45-grade super were drilled in to the acre.

F. WHITTLESEA, Jabuk (Sword).

This entry was successful in the County Chandos Crop Competition. The plants had headed well, but the grain was tending to shake out rather freely, causing an appreciable reduction in yield.

Weeds were fairly plentiful, consisting of charlock, barley grass, dandelion, and nancy. The only disease doing any harm was a little take-all on the lighter ground.

In connection with trueness to type, the variety contained rather less brown chaffed impurities than the average Sword, but on the other hand a few plants of both Cape and Malting barley were present.

The evenness was fairly good, only a little land being missed at seeding.

Since 1929 the system of cropping of the field had been oats, fallow, wheat, oats, fallow, and to carry this crop the land was ploughed in August, given a good tillage, and planted in the following June with 60lbs. of Sword wheat and 90lbs. of 45-grade superphosphate to the acre.

W. F. WURST, Laura (Nabawa).

The crop of Nabawa wheat grown by Mr. Wurst gained the first prize in the Northern Crop Competition.

It was very clean and free from weeds, only isolated plants of hogweed, barley grass, wild oats, and clustered clover being seen.

Not sufficient disease to cause appreciable damage was present, there being a little take-all, loose smut, and a few spots of rust.

There was a fair amount of admixture of other varieties, including both brown chaffed, white chaffed, and bearded wheats, together with a little barley. The drilling was good, but the crop varied considerably, being heavier, and tending to lodge on the friable land, and much lighter on the patches of hard red soil.

The land was worked on the bare fallow-wheat rotation, and for this crop was broken up in August, cultivated in October and May, and 58lbs. of Nabawa wheat, together with 90lbs. of 45-grade super, combined in to the acre at the end of July.

CARBONATE OF LIME EXPERIMENTS.

(A Talk Broadcast through 5 C.L. by R. C. SCOTT, R.D.A., Supervisor of Experimental Work, Department of Agriculture.)

In continuation of the fortnightly talks given by officers of the Department of Agriculture, it is proposed to-night to discuss the results obtained from a series of experiments dealing with the use of carbonate of lime. These experiments were conducted at a number of centres and were designed with the object of showing the value of carbonate of lime as a fertilizer for cereal crops.

Lime is an essential plant food, but on the other hand the amount removed by crops is very small, and it is exceptional to find a soil so deficient in this substance as to limit plant growth. At the same time, lime plays an important part in agriculture, because of its influence on the physical properties of the soil. It leads to an improvement in the texture of what would otherwise be sticky heavy clay land. It increases the water-holding capacity and modifies the looseness of sands, whilst it also has influence in neutralising the harmful conditions associated with sour or acid soils.

However, it is not from the point of view of carbonate of lime as an improver of the physical properties of soils that I wish to speak to-night, but to deal more directly with its value as a plant food for crops seeded on fallow land.

Notwithstanding the fact that no benefit could be anticipated, experiments dealing with this aspect became necessary because of the persistent advocacy of the use of carbonate of lime as a fertiliser by certain interested parties. As a result, a number of farmers have purchased carbonate of lime under a misapprehension as to its manurial value, and it was only by obtaining actual yields from a series of experimental plots scattered throughout the agricultural areas of the State, together with the field demonstrations thus provided, that the true position of this material could be shown.

Accordingly, arrangements were made with a number of farmers to plant experimental plots under the supervision of officers of the Department of Agriculture. In all, seventeen plots were planned. They extended from Booleroo Centre in the North, throughout the Lower North and Murray Flats to Strathalbyn in the South.

At every centre four plots of wheat were planted on fallow land, each being approximately two acres in area and receiving the following treatment:—

Plot 1—No manure.
Plot 2—1cwt. of carbonate of lime per acre.
Plot 3—1cwt. 45 grade superphosphate per acre.
Plot 4—1cwt. 45 grade superphosphate together with 1cwt. of carbonate of lime per acre.

In this experiment three comparisons were possible, namely:—

That between the yield from the "no manure" and the 1cwt. of carbonate of lime plots.

That between the yield from the 1cwt. of superphosphate and the 1cwt. of carbonate of lime plots.

That between the yield from the 1cwt. of superphosphate and the 1cwt. of superphosphate plus 1cwt. of carbonate of lime plots.

When the returns from the whole seventeen centres were averaged the following results were secured:—

No manure—18bush. 59lbs. of wheat per acre.
1cwt. of carbonate of lime—18bush. 33lbs. of wheat per acre.
1cwt. of superphosphate—23bush. 28lbs. of wheat per acre.
1cwt. of superphosphate, 1cwt. carbonate of lime—22bush. 25lbs. of wheat per acre.

From these figures it will be seen that the returns from the "no manure" and "1cwt. of carbonate of lime" plots were practically equal, indicating that no advantage was gained by the use of the latter.

A similar conditinn of affairs exists when the yield from the superphosphate only plots is compared with that from the area receiving both superphosphate and carbonate of lime.

On the other hand, if the return from plots receiving 1cwt. of superphosphate is compared with that from those receiving an equal weigh of carbonate of lime, it will be noted that there is a very marked advantage in favour of the former; in fact, practically 4½bush. of wheat to the acre.

Reviewing the results, therefore, an application of lime has not brought about an increase in yield over and above that from the "no manure" plot. Further, a combined dressing of superphosphate and lime has not given a greater quantity of wheat than the plot receiving superphosphate only. Consequently, no recommendation in favour of this material is possible.

It is true that the foregoing returns are the result of a single season's work, but it is most unlikely that weather conditions would affect the comparative yields to any extent. It is considered that, within limits, no matter what type of season was experienced, the influence would be the same on both the limed and unlimed plots. Consequently, as the experiment was fully replicated and conducted under a variety of soil conditions, it may be accepted that the results obtained are conclusive so far as the fertilising effect of carbonate of lime applied to wheat crops in this State is concerned.

It is, therefore, definitely stated that carbonate of lime must, on the average, cause distinct financial loss if used as a manure for cereal crops.

Earlier in the evening reference was made to the fact that lime occupied a definite place in improving the physical properties of soils. However, generally speaking, the wheat-growing lands of South Australia are well supplied with this material. As a rule, the greatest loss of lime occurs where there is high annual rainfall and free drainage, with the result that, except for a relatively small area of red boggy land in the Lower North, the greatest need for lime in this State occurs in the sour soils of the Adelaide Hills and South-East.

Under such circumstances, dressings of at least half and preferably 1 ton to the acre are necessary, and these should be added to the land about once in every ten years.

For suburban gardeners, who are troubled by the heavy nature of the land with which they have to deal, an application of about 1lb. of lime to the square yard is recommended.

In this connection, as ground shell consists of hard water-worn fragments of calcium carbonate, which are not readily dissolved by soil moisture, other forms of agricultural lime of a more soluble nature are to be preferred.

In conclusion, therefore, whilst lime has a certain value for improving soil conditions, the experiments show that it is not required as a fertiliser for cereal crops in South Australia.

In the following table the experiments from which the results quoted were obtained are shown.

Experimenter.	No Manure.		1cwt. Carb. Lime.		1cwt. Super.		1cwt. Super, 1cwt. Carb. Lime.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
F. Cummings, Belalie North	13	2	13	10	18	24	18	7
A. J. Symonds, Bundaleer	19	1	19	53	20	42	21	14
W. A. Mills, Booleroo Centre	18	41	19	16	23	40	23	6
J. C. Kleinig, Laura	23	42	24	50	26	45	25	12
H. R. Lines, Laura	9	17	9	48	13	23	13	32
S. T. Arthur, Peroomba	23	24	22	1	27	—	26	33
Jettner Bros., Yandiah	13	15	12	20	15	45	14	55
W. H. Brown, Alma	20	28	20	39	29	10	28	31
Mugge Bros., Blyth	38	34	36	10	44	41	39	29
A. W. Roediger, Gawler River	17	55	19	18	25	7	23	15
E. Day, Reeves Plains	18	50	18	20	28	6	27	51
J. B. McDougall, Riverton	12	10	11	21	14	9	14	2
F. W. Coleman, Saddleworth	32	25	26	59	31	28	29	40
Molineux Bros., Tarlee	18	40	19	13	22	53	20	38
S. A. Bretag, Mannum	13	35	13	27	20	45	20	22
J. Watchel & Sons, Palmer	18	40	19	4	23	—	—	—
Chas. Brook, Woodchester	11	2	9	43	13	53	12	6
Means	18	59	18	33	23	28	22	25

FARM SHEEP AND WOOL.

MANAGEMENT OF THE FARM FLOCK.

[By C. A. Goddard, R.D.A. (Asst. Wool Instructor, School of Mines).]

(*Continued from page* 844.)

The success of the farm flock is dependent on good management. The first essential is good stock, nevertheless the very best sheep cannot produce successfully under bad management.

The object of keeping a flock is to augment the farm revenue, and with this object in view, the flock must be run on sound, practical, and commonsense lines. It is not advisable to make the sheep entirely subservient to the agricultural side of farming, but to a large extent sheep work may be dove-tailed into the general activities, and in this way the farm may be most economically managed.

In reviewing the season's work, shearing is regarded as the beginning of the sheep year, and marketing the lambs the end.

There are many jobs in connection with sheep during the year, such as shifting the flock from paddock to paddock, cleaning water troughs, &c. This article, however, is confined to the major operations of:—

1. Shearing and branding.
2. Dipping.
3. Joining ewes and rams, and care of in-lamb ewes.
4. Lambing and lamb marking.
5. Blow-fly treatment.
6. Marketing lambs.

Shearing.

Time of shearing is the first consideration, and it should be arranged to fit in with other farm work. There is usually a slack time just before hay cutting. Shearing, therefore, should be done at this time, because if left until afterwards, there is the danger from grass seeds. The time of shearing will differ in different districts, from early August until early November. Autumn shearing which some farmers favour—is not recommended, because it means that the ewes are carrying a lot of wool during the fly season, and also when grass seeds are troublesome.

Preparing for Shearing.

The conditions under which a great number of farm shearings are conducted are so rough that it is impossible to do the work cleanly and with dispatch, and the wool—mainly due to lack of facilities—is marketed in a disgraceful manner. Shearing need not be looked upon as a distasteful job. In fact, when conditions are convenient it makes a pleasant break in the routine work of the farm. It is at shearing that the wool harvest is gathered, and every effort should be made to do it thoroughly and economically.

Few farmers can afford to set aside a building to be used only as a shearing shed, therefore one of the farm buildings—the barn is usually the best—must be used. When a farmer is building a new barn he should construct it in such a way that it may be readily converted into a shearing shed, and be used for the dual purpose of barn and shearing shed. The average farm barn can be fixed up for shearing with very little expense, and the fittings should be so constructed that they can be taken down and stored for future use.

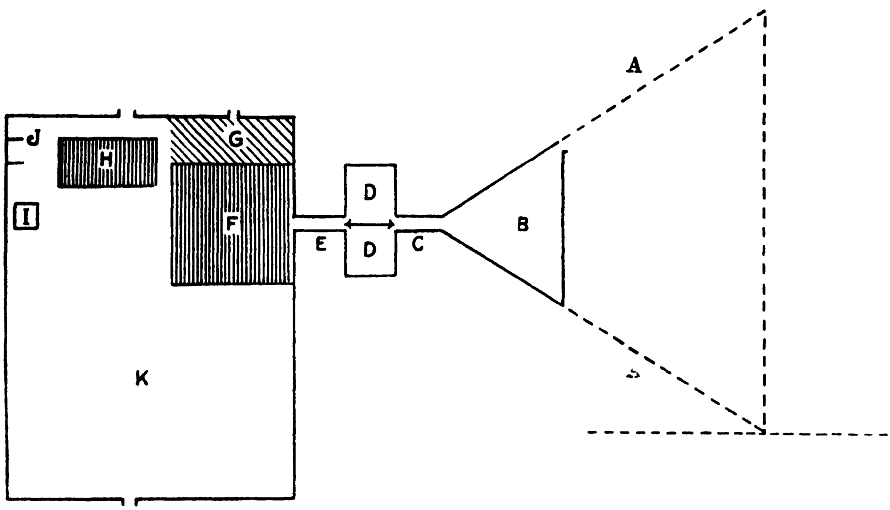
The first essential when preparing the barn for shearing is to clear it thoroughly, in order to provide ample room for the shearing. All waste chaff and straw must be removed, because they are most objectionable in wool, and reduce the value

of the clip. Elaborate fittings are not required, but everything should be convenient for working the sheep and handling the wool.

The essentials are: good, sound yards, a few sections of gratings on which to stand the sheep overnight, shearing board, wool table, box press, and at least 2 wool bins. All these can be made by a handy man, and in a number of instances a great deal of the material required is to be found on the farm, and it only requires a few days' labour to put everything in order.

YARD AND SHED ACCOMMODATION.

The following sketch will show the lay-out of the yards, and the temporary fixings in the barn.



A. & A. Wings to assist in yarding sheep.
B. Receiving yard.
C. Drafting race.
D.D. Sorting pens; also serve as forcing pens for sheding the sheep.
E. Race into shed.
F. Sweat pen with grating
G. Shearing board.
H. Wool table.
I. Wool press.
J. Wool bins.

Shearing cannot be learnt by reading articles, but there are a few special points which should be observed:—

1. Pay special care to the clean shearing of the points and breech, because woolly points collect grass seeds, and a dirty breech attracts flies.
2. When removing belly wool, do not rob the fleece of good wool by shearing too wide, at the same time be sure to take off all the belly wool.
3. Avoid second cuts, they spoil a lot of wool.
4. Do not break through the thigh when shearing the near hind leg, this robs the fleece of a large piece of wool which falls into the floor locks.

Branding the Sheep.

Branding must be carefully done to comply with the regulations of the "Brands Act." The best method is to run a few sheep into a race or small pen, if this is not done, sheep will be misbranded, and many will be smudged.

The most important of the branding regulations are:—

1. Any permanent paint mark and ear mark must be registered.

2. Any owner of sheep using a paint brand or ear mark without registration is liable to a heavy fine.

3. Sheep brands are allotted for definite positions and colours. The positions are "top of shoulders," "near ribs," "off ribs," "rump," and the colours are "black," "red," "blue," "green," and "yellow." The certificate of registration indicates position and colour, and these must be strictly adhered to. A diagram is shown in the margin of the certificate.

4. Figures 2 to 9 may be used as flock marks by owners of registered brands, on any position and in any colour.

5. No sheep may be rebranded without permission in writing from the Registrar of Brands.

6. No brand must be obliterated on a sheep or a sheep skin. The penalty is a very heavy fine or imprisonment.

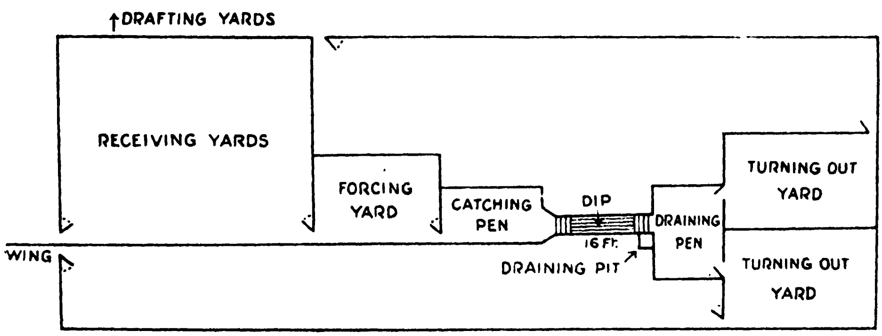
7. Paint dots or strokes must not be used as culling marks, they are registered brands and their use amounts to the infringement of another owner's brand.

Dipping.

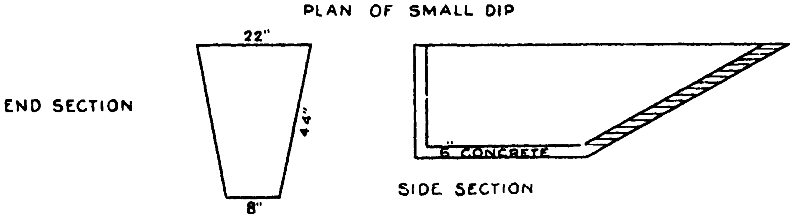
It is not advisable to travel sheep long distances to a co-operative dip. In the first instance, it knocks the animals about, and secondly, travelling on dusty roads after dipping creates a dirty tip that will remain until next shearing and reduce the value of the clip. Dipping is an important operation and is done either to destroy tick and lice, or as an insurance against infection, and the farmer should supervise the work himself, and dip when it is convenient.

It costs very little to make a small dip. Lime, sand, and gravel can usually be obtained on the farm, or somewhere adjacent and can be had for the carting; a bag or two of cement is all that need be bought. It is a mistake to make the dip too large, it costs a lot to fill a big dip, and a quantity of dipping fluid is wasted. A dip 16ft. long, 22in. wide at the top and 8in. at the bottom, 3ft. 6in. deep, will hold approximately 350galls. and requires 3 packets of powder.

The following sketch demonstrates a small farm dip:—



PLAN OF SMALL DIP



SIDE SECTION

METHOD OF CONSTRUCTION.

Make the excavation large enough to allow for a 6in. wall on each side and a 9in. bottom. The entrance, *i.e.*, where the sheep are dropped in, should be 4ft. across. Fix the concrete boards to the shape required, then pour the concrete

between the boards and the sides. The concrete should be made rich with lime, a little cement added is an advantage. Run in the bottom and when the walls and bottom are dry, smooth over with cement, and the job is finished. It is advisable to build the walls a few inches above the ground to prevent dust drifting into the dip. The sides of the entrance well should be 1ft. to 18in. above the sides to save wastage by splashing as the sheep are dropped into the dip.

There is another method of constructing a dip. It does not require concrete boards and this is its only advantage. Two sloping trenches are dug, and then filled with concrete, the middle is then dug out and the bottom put in.

When dipping sheep, there are a few important points to observe:—

1. Time to dip: When the sheep have been hand-shorn, they may be dipped almost directly after shearing, but when machine shorn, 4 to 6 weeks must be allowed for sufficient wool to grow to make dipping effective.
2. The sheep should be yarded for a few hours prior to dipping, to allow them to get rid of their droppings, otherwise the dip quickly becomes foul. Further, it is dangerous to dip sheep while over-heated from droving.
3. It is advisable to dip ewes and lambs separately and do not join them again until the ewes have been well drained.
4. Dipping must be done thoroughly to be effective, and the directions printed on each container should be strictly observed.
5. It is not advisable to dip during extremes of temperature.
6. Sheep should be left in the draining pen until they are well drained, to allow the drippings to drain back to the dip.
7. It is important that each sheep should remain in the dip long enough to be saturated.
8. When replenishing the dip, be careful to maintain the strength.

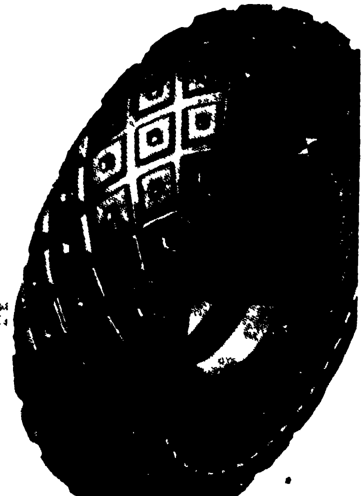
Joining Ewes and Rams.

This is one of the most important of the seasonal operations, because it controls time of lambing and to some extent lambing percentage.

It is important for lambing ewes to have greenfeed, therefore, lambing should be timed to start when it is reasonable to expect greenfeed, either as natural grasses or in the form of early barley or oat crops that have been sown for greenfeed purposes. The gestation period for ewes is 5 months, and as greenfeed can be reasonably expected in June in most agricultural districts, the ewes and rams should be joined in the first week of January. Where ensilage is available, lambing may be arranged much earlier and advantage taken of the high prices always ruling for spring lambs early in the season.

The special factors to observe in joining to ensure a successful lambing are:—

1. The condition of the breeders, good forward store condition is the best, because over-fat ewes and rams do not mate well and should the ewes be very poor, they will not come in season. It is wise to flush the ewes with good feed just before joining. This tends to bring them in season quickly, and ensures a more even drop of lambs. When using British rams, great care must be taken to prevent them from getting too fat. It is a wise precaution to bring them in and feed them on a small ration of oats for a few weeks before joining. Old rams of these breeds should never be used, because they become very sluggish with age. The rams should be well inspected, and if their feet are long, they should be trimmed.
2. Join the ewes and rams in a yard and leave them there for a few hours before taking to the paddock, and for the first 2 weeks, muster the flock every second evening and leave them yarded until morning.
3. When the flock is large enough to require 4 or more rams, it is a good plan to join only half the rams for the first week, then remove them and feed them on



oats for a week and join the remainder. This method is recommended because it is a well established fact that lambs that are "got" while the rams are fresh are always better developed than those produced by rams that are over-worked. For the last 2 weeks, join all the rams. Many farmers have the rams joined for 6 weeks and even 2 months. This is a mistake, as they should be removed after 4 weeks. Then when a month has elapsed, a Merino ram or two should be joined with the ewes. A few late Merino lambs are better than having dry ewes in the flock.

4. The percentage of rams to use will depend somewhat on circumstances; if the flock is yarded regularly 2 per cent. should be ample. If this is not done, 2½ to 3 per cent. should be used—40 ewes is generally considered enough for British rams. When Merino rams are used, the percentage may be reduced.

The In-Lamb Ewes.

The lambing percentage and the wool clip are largely dependent on the care of the pregnant ewes. With the exception of a few isolated parts, the natural grasses in the agricultural districts of South Australia are dry and non-nutritious during the gestation period, and there is not sufficient nutriment available to enable the ewes to develop the foetus and grow a good fleece of wool. Therefore, with very few exceptions, some supplementary feeding to supply protein is absolutely necessary to produce good lambings. Grain barley or oats will supply the necessary concentrates and only a small ration is required if there is plenty of roughage available. A ration of ensilage is preferable to grain, it is a better balanced ration and a preventive against twin lamb disease. Starvation and bad management are responsible for the absurdly low lambing percentages in the agricutural districts. The ewes should be disturbed as little as possible while pregnant and dogs should never be allowed near them. A few weeks before lambing is due to commence, the ewes should be yarded, crutched and well swabbed as a preventive treatment for fly strike. The crutching must be carefully done, no legging or kneeing must be allowed as this may easily cause losses when ewes are heavy in lamb. Poison baits should also be laid about this time to destroy foxes. It should be the farmer's aim to rear every lamb that is dropped, and he will never do this unless precautions are taken to combat these pests.

Lambing.

When ewes are lambing to Merino rams, little trouble need be expected, and a visit every second day should be ample, but when Merino ewes are lambing to British breeds—especially Shropshire, Dorset Horn, and Lincoln—then the flock should be visited in the early morning and the last thing at night, and assistance given to any ewes that are in difficulties. The normal presentation for a lamb is for the head with a fore-leg each side to come first, but occasionally a lamb comes the wrong way. In these cases the lamb should be gently pushed back into the womb, and every effort made to correct the position. More trouble is caused by the lamb being too big in the shoulders to allow of normal delivery. In instances of this kind assistance must be given by gently pulling the lamb in unison with the natural muscle contraction. Force should never be used as this is liable to damage the ewe. It is advisable to tie the legs of a ewe before giving assistance, otherwise in her excitement she may leave the newly born lamb; place the lamb in a convenient place for the mother to clean it, when she has done this she may be safely liberated.

Lamb Marking.

The most important factor in this work is to operate while the lambs are young, because if left until they are large, the marking will cause a serious check in growth. The work must also be done under antiseptic conditions, *i.e.*, all knives and ear markers and also wounds should be disinfected, any of the carbolic liquid

sheep dips are excellent for the purpose. Every care must be taken to avoid tetanus infection which is caused by dropping treated lambs into dust and filth. Therefore the lamb-marking should be done on clean ground. Always cut off the tip of the scrotum and do not split it to remove the testicles, dock the tail at the second joint. Another method of castration is with the Burdizzo pincers. This method is slow, but effective when carefully done, and has the advantage that it does not cause bleeding and consequent check in growth. This method is preferred when the lambs have been left until they are well-grown.

Blow-Fly Pest.

There is only one effective method of dealing with the blow-fly pest, and that is prevention. There is no excuse for owners of small flocks for having ewes struck, and preventive treatment is the only rational one, because once the ewe is struck the damage is done. She runs a fever temperature which affects the milk, the lamb receives a check, the wool develops a break and the whole fleece is frequently lost. The maggot flies are most active in late autumn and spring, and the farmer should protect his sheep in these seasons. It is also well known that any treatment may only be effective for a limited period, and sheep owners should be prepared to repeat the treatment as often as necessary. Arsenic is definitely the most effective poison and no specific that does not contain .5 per cent. of arsenic in solution should be used. An emulsion of oil and arsenic is undoubtedly the best, but often expensive, and a solution of arsenic and water may be used with safety. Boil ½lb. of white arsenic for 20 minutes with its own weight of washing soda in 1gall. of water. This will give a 5 per cent. solution by weight. For use, add 9 parts of water, or to 1 pint of the stock solution of arsenic, add 9 pints of water.

Method of Treatment.

At the first sign of trouble from flies, bring the ewes in and clean them by crutching, then swab with arsenic solution. This must be done with care because it is absolutely necessary to saturate the wool and thoroughly wet the skin. To ensure this, rub well with the hand after swabbing. In very bad seasons it may be necessary to repeat this treatment several times. The cost of the arsenic solution is very little and therefore there is only the labour to be considered.

Treatment of Affected Ewes.

A badly blown ewe is a hospital case, and should be treated as such. It should be brought in near the homestead, and treated every day until the wound has healed. First clean all dirty wool away from the affected part with shears, then remove the maggots with a penetrating fluid, such as carbolic liquid sheep dip. Castor oil may then be applied if the wound is bad. Do not use arsenic on raw wounds. Sump oil mixed with a little castor oil is most effective, but it stains the wool. It is preferable, however, to stain a little breech wool, rather than lose the ewe through septic poisoning.

Marketing Lambs.

This is the last important seasonal operation before shearing. The main factors in marketing lambs are:—

1. Lambs should always be sent to market when they are ready. Never hold them for a better market. The ideal weight for lambs is 32lbs. dressed, which means 66lbs. to 70lbs. live weight.

2. Every care must be taken not to bruise lambs when drafting and trucking. Dogs and prodding sticks must never be used.

3. The lambs should not be separated from their mothers until the last possible moment.

(To be continued.)

STATE OF SOUTH AUSTRALIA.

EXPORTS OF EGGS AND EGG PULP, JULY-DECEMBER, 1934 AND 1933.

By A. W. BOWDEN (Acting Government Statist).

Compiled from returns collected direct from Merchants.

GRAND TOTAL EXPORTS.

Quantity.—Eggs in shell and in pulp in terms of eggs in shell—July-December, 1934, 5,800,000 dozen; 1933, 5,600,000 dozen; 1932, 5,000,000 dozen; 1931, 3,500,000 dozen; 1930, 1,300,000 dozen.

Value.—July-December, 1934, £265,424; 1933, £263,819, increase £1,605. The interstate trade increased from £52,474 to £58,654, and the trade with oversea countries was slightly less than the 1933 level, £206,770 (£211,345).

The following are the details of exports, July-December, 1934 and 1933:—

State.	Eggs in Shell.		Egg Pulp.		Total Value.
	Doz.	£	Lbs.	£	£
New South Wales (Ex. B. H.) ...	163,865	5,881	560,284	18,386	24,267
Broken Hill	122,897	4,674	9,264	270	4,944
Victoria	69,223	2,291	836,150	23,526	25,817
Other States	46,427	2,107	45,664	1,519	3,626
Total Interstate, 1934...........	402,412	14,953	1,451,362	43,701	58,654
1933...........	410,738	13,997	1,415,848	38,477	52,474
Oversea (Direct), 1934...........	4,275,658	206,770	—	—	206,770
1933...........	3,944,216	207,324	148,000	4,021	211,345
Grand Total 1934...........	4,678,070	221,723	1,451,362	43,701	265,424
1933...........	4,354,954	221,321	1,563,848	42,498	263,819

BUSH FIRES.

The Library of the Department of Agriculture acknowledges the receipt of a booklet, "Prevention and Control of Bush Fires."

In this handbook, in addition to a summary of the Bush Fires Act, 1933, there are included articles on prevention and fighting bush fires; organisation of fire prevention and fire fighting activities; prevention aids, historical items of interest, and other matters of interest to the public generally and residents of rural districts in particular. It should assist in consolidating and developing the activities of all organisations which have for their objectives prevention of, and when the necessity arises, fighting bush fires. Published by R. J. Rose, Laura. Price 7d., postage included.

SUMMARY OF PLANT DISEASE RECORDS IN SOUTH AUSTRALIA FOR TWO YEARS ENDING 30TH JUNE, 1934.

[By D. B. ADAM, B.Agr.Sc., Waite Agricultural Research Institute, University of Adelaide.]

In preparing this summary the writer has used records made by his predecessor, Mr. Samuel, for the period under review. The summary follows the same lines as those taken in dealing with earlier biennial periods and published in this *Journal*.

CEREALS.

Take-all (*Ophiobolus graminis*) in the form of "whiteheads" was more prevalent than usual in 1932. This occurrence coincided with spring conditions which for the State, taken generally, were cool and more showery than the average. The possible reasons for the association between such spring weather conditions and the more extensive development of take-all and other factors affecting the severity of take-all have been dealt with in articles published in *Phytopathology*, vol. 23, pp. 721-728, and in this *Journal*, vol. 37, pp. 664-674, 799-805, 976-983.

The stunting diseases of wheat and oats sometimes associated with eelworms (*Heterodera schachtii*) and in other cases with the fungus *Rhizoctonia solani* continue to be reported from various areas, particularly the mallee districts. These diseases affect the plants in the earlier stages of their growth. In spring, with the advent of warmer weather, the plants in a sense grow away from the disease though the earlier injury influences permanently the vigour of affected plants. Measures for the control of the *Rhizoctonia* disease have not yet been devised.

FORAGE CROPS.

Except in parts of the wetter districts where leaf spotting and collar rot due to *Ascochyta sp.* may occur, pea crops normally were little troubled by disease. In 1932, in association with wet winter conditions, a leaf-spotting disease of peas similar in general appearance to that due to *Asochyta* occurred in epidemic form in the mid-northern agricultural area. The fungus has not been definitely determined. On being referred to the Imperial Mycological Institute it was reported that the fungus showed "many features in common with *Gloeosporium pisi* Oudem.," but "that on present evidence one could not say they belonged to the same species."

FRUIT CROPS.

Brown rot (*Sclerotina fructicola*) on peaches was recorded from an orchard in the metropolitan area in 1932, and on cherries from the South-East in 1933. The occurrence in 1932 was the first time that the disease had been recorded in South Australia since 1902. Although it is possible that summer conditions are usually unfavourable for the development of this disease in South Australia generally, a careful watch for this disease should be kept, as experience elsewhere has shown that once well established, this disease is difficult to eradicate.

Powdery mildew of stone fruits (*Sphaerotheca pannosa* var. *persicae*) affecting green peach and apricot fruits prior to ripening first noted in South Australia in 1929 was recorded from a number of orchards in the neighbourhood of Adelaide. From observations made by Mr. Beaumont, formerly of the Horticultural Branch, Moorpark apricots appeared to be less susceptible to this disease than Oullin's Early.

In recent years a disease of apricot trees characterised by a local gummosis and dying back of limbs has attracted attention because of an apparent increase in its prevalence. The disease generally starts at some intermediate point on the limb. Its development is usually attended by gumming and a curious longitudinal

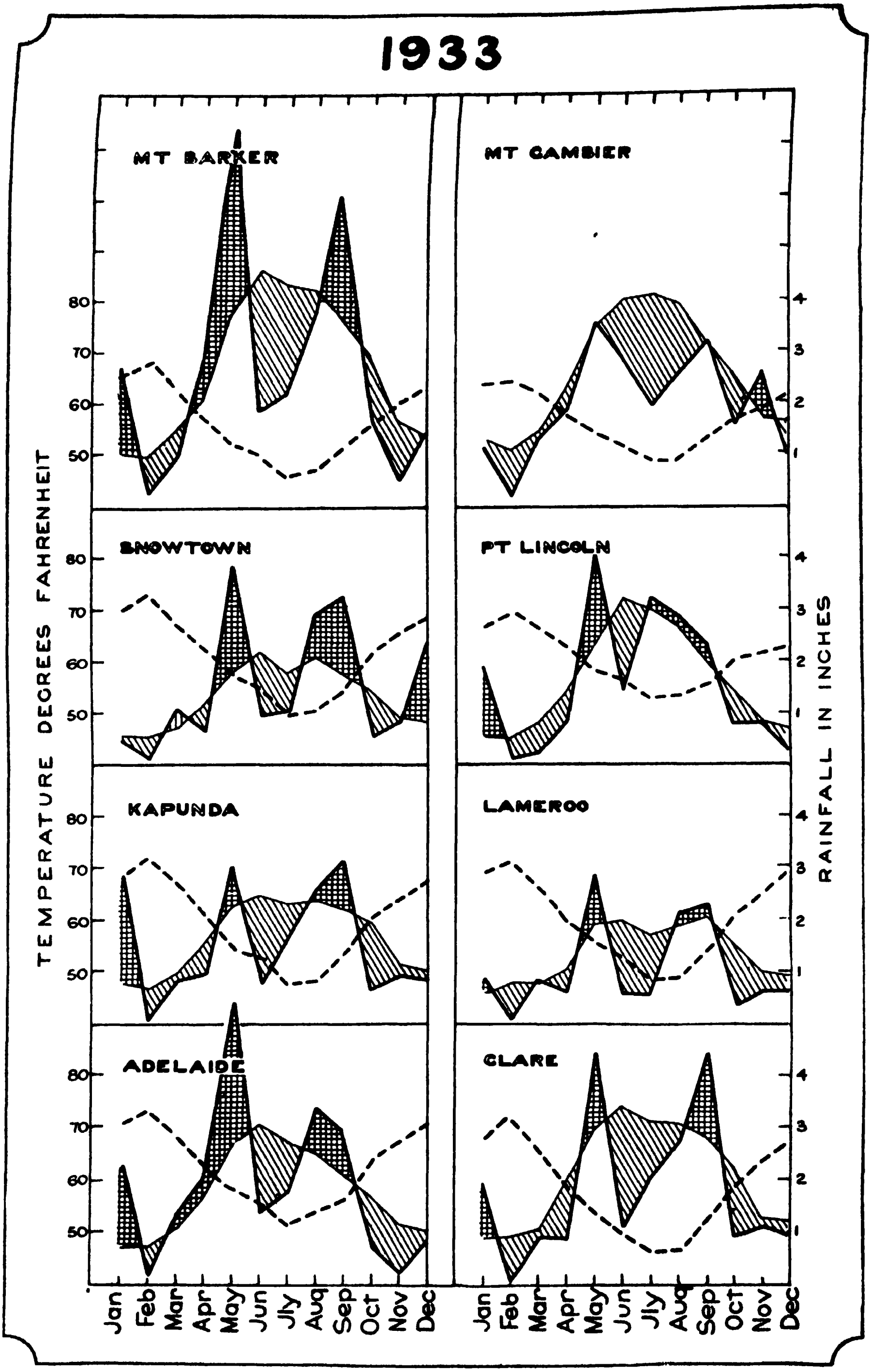


Figure 1.—Shows total rainfall and mean temperature for each month during 1933 at eight stations in South Australia;—actual rainfall each month during 1933—average rainfall for each month; single hatching shows rainfall below the average for each month, cross hatching, above the average for each month. – – – Mean temperature for each month during 1933.

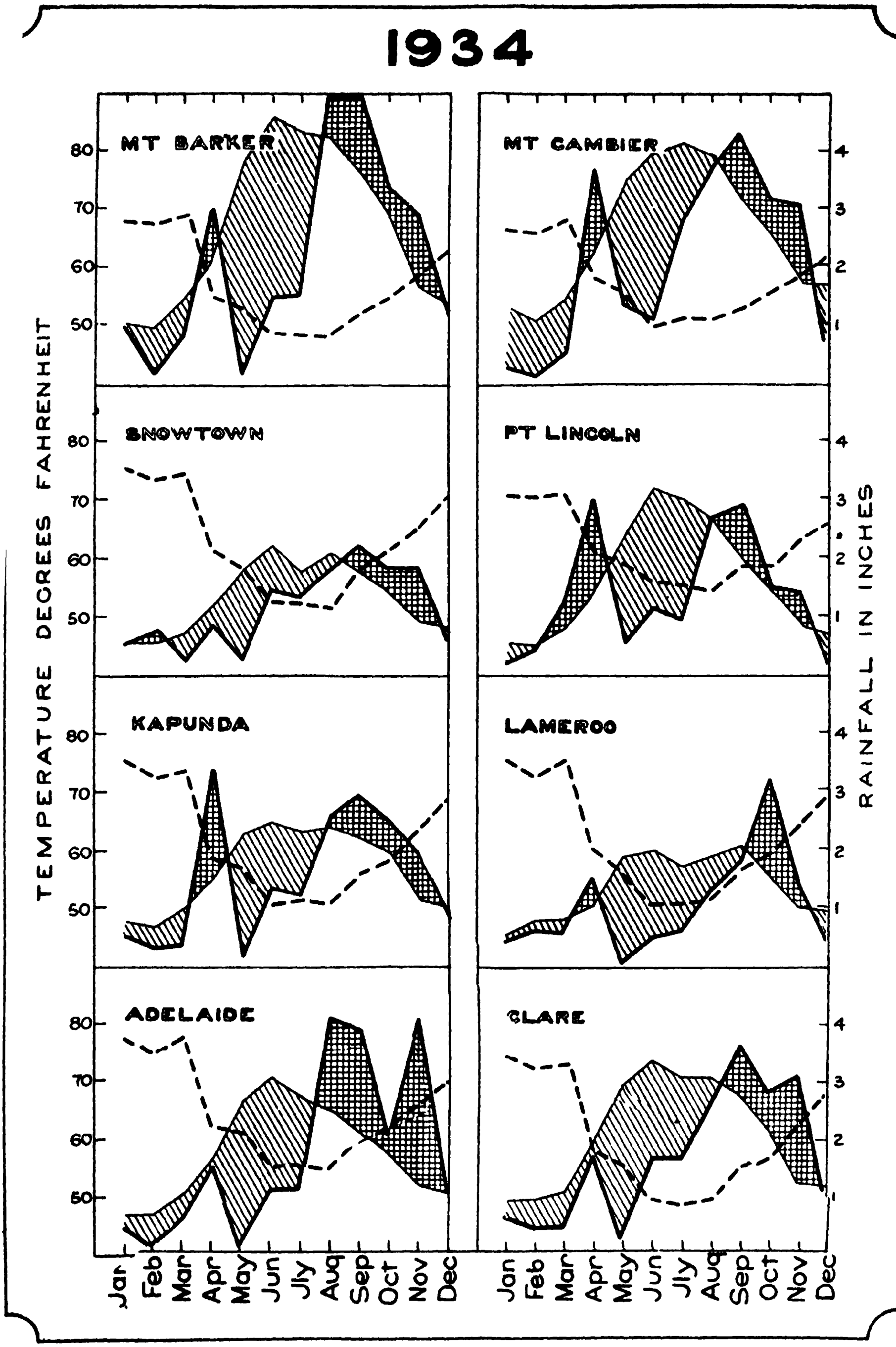


Figure 2.—Shows total rainfall and mean temperature for each month during 1934 at eight stations in South Australia;—actual rainfall each month during 1934— average rainfall for each month; single hatching shows rainfall below the average for each month, cross hatching, above the average for each month. ---Mean temperature for each month during 1933.

cracking of the bark. The wood in the infected region ultimately becomes brown and very brittle. The growth beyond the affected region is fairly normal until the disease has advanced considerably, when the death of the whole limb occurs rapidly. This sudden death occurs in early summer, the leaves drying out rapidly and remaining attached to the tree. It is quite characteristic for one limb after another to be affected, the disease ultimately reaching the butt of the tree where it completes the destruction. Observations in the field indicate that the disease is due to a parasitic agent which enters through wounds made in pruning. A fungus has been isolated consistently from the diseased areas, and its relation to the disease is now the subject of study.

The better-known diseases such as "Shothole" or "Scab" of apricots, peach "leaf curl," and pear "black spot" were in more than usual evidence in 1932, particularly in orchards where control methods known to be satisfactory were omitted or improperly performed.

VEGETABLES.

A bacterial "sore eye" disease of the potato has assumed some importance in the irrigated swamp lands along the lower part of the Murray River. The soils in this area, like those in Victoria, in which a similar disease occurs, are acid and have a high organic matter content.

Irish blight was reported from the South-Eastern district in 1932. Downy mildew of the onion and of the lettuce, Halo blight of beans (*P. medicaginis phaseolicola*), ring spot of cabbage (*Phyllosticta brassicola*) were also recorded.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

CONFERENCE OF YORKE PENINSULA BRANCHES.

Presided over by Mr. W. D. Wright (Chairman of the Boor's Plains Branch), the Annual Conference of Yorke Peninsula Branches was held at Kadina on March 6th. There was a good attendance of delegates from the Moonta, Paskeville, Bute, Kilkerran, Arthurton, South Kilkerran, and Boor's Plains Branches, and boys from the Kadina Agricultural High School. Councillor E. H. Hall welcomed the visitors on behalf of the Kadina Council, and the opening address was delivered by Mr. A. M. Dawkins (Member of the Advisory Board of Agriculture). The Department of Agriculture was represented by Messrs. H. B. Barlow, H.D.D. (Chief Dairy Instructor), R. C. Scott, R.D.A. (Supervisor of Experimental Work), C. F. Anderson (Poultry Expert), W. C. Johnston, R.D.A. (District Instructor), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

The following papers were read and discussed:—"The Value of Reading to the Farmer," H. K. Queale (Boor's Plains); "Horse Dipping," S. Pontifex (Paskeville); "Pig Raising," S. Chynoweth (Boor's Plains); and "Wheat Selection," L. McCarter (Boor's Plains).

Mr. Dawkins presented the following trophies to the successful competitors in the Northern Yorke Peninsula Crop Competition:—First prize, silver shield, presented by the Northern Yorke Peninsula Agricultural Bureau Field Trial and Show Society, Messrs. G. E. and H. M. Meier; second place, Mr. C. Rodda, silver cup; and third place was won by Mr. J. H. Bussenschutt, silver hot water jug.

The Boor's Plains Crop Contest resulted:—Mr. L. E. Yelland, silver cup, and Mr. T. A. Stanway, silver rose bowl, equal, 92 per cent.; third, Mr. M. D. Wright, 91.3 per cent.

Junior Crop Competition.—First prize, Edgar Drewett, with Donald Garner second. They were given books on farming.

The Boor's Plains Branch entertained delegates at luncheon, after which the Conference inspected the Amscol Factory.

It was decided that the arrangements for the 1936 Conference should be undertaken by the Arthurton Branch. The following resolution was carried:—Mr. O. Heinrich (Kilkerran) moved and Mr. F. Koch seconded, "That this Conference urges an amendment of the law affecting the fire raking of stubble, making it possible for one man to do fire raking of stubble without the consent of a fire controller." Conference concluded with an address, "The Care and Management of Poultry," delivered by Mr. C. F. Anderson.

The secretarial duties of the Conference were in the able hands of Mr. S. Chynoweth.

ARTIFICIAL WATER CATCHMENTS.

[*The article published below forms portion of a report submitted by the Engineer-in-Chief (Mr. J. H. O. Eaton) in reply to an Agricultural Bureau Congress resolution asking the Government to review the water situation in districts where permanent wells or springs have not been found, and which are not likely to be reticulated for some time from a reliable reservoir.*]

The information in respect to artificial catchments given hereunder includes that gathered from various sources, and is only intended to give such data as may permit an interested person to become acquainted with the method of construction and possibilities of this form of water supply.

LOCATION FOR USE.

In districts where the rainfall is small and the ground is porous or sandy, an artificial catchment is necessary to provide an effective run-off so that water may be collected and stored during even light showers.

For many years past, open sheds have been erected for settlers on Eyre's Peninsula; usually two sheds are constructed of the gable or lean-to type as may be selected by the settler, the over-all dimensions being 30ft. x 34ft. 6in. (115 sq. yds.). Each shed has two galvanized iron tanks of 2,500galls. capacity each (see accompanying sketches). These sheds serve a double purpose, one closed in may be used as a dwelling, and the other as a shelter for implements, &c. The roof serves as an artificial catchment, and water is stored sufficient for the limited demand during the early years of settlement. The sheds and tanks are erected by private contractors after tenders have been called by this Department. The settler is allowed to repay the Government for these improvements by instalments, covering principal and interest, spread over a term of years. Following development, this limited supply becomes inadequate for domestic purposes, horses for working the section, and any stock that may be acquired.

The section may be located within a few miles of a reticulated supply but the elevation of the property may preclude a supply by gravitation, and pumping would be uneconomical. In such cases water may be obtained by carting from the nearest standpipe provided on the reticulated system, or other permanent supply in the locality, but the time necessary for such purposes either restricts the stock that can be carried or affects the time that can be spent on development work, &c.

For land of the nature referred to, in locations far removed from a permanent supply, the artificial catchment appears to be a proposition worthy of serious consideration.

FORMS OF CONSTRUCTION.

The construction of artificial catchments may be divided into two types:—

1. Treatment of the ground to make surface impervious.
2. The use of some impervious material:—
   (*a*) Bitumastic sheeting.
   (*b*) Galvanized iron (flat sheets).

In either case the site must be sloping and approximately uniform or graded.

1. Impervious Ground Surface.

For this method of construction the prepared surface is treated with Colas, Laykold, Mexphalte, or some bitumastic preparation. Experimental areas were constructed in the above manner on Eyre's Peninsula near Kimba in May, 1929. Eighteen plots were laid down of varying mixtures and, after exposure for 17

months without re-dressing it, it is reported that only two plots so treated stood up to the tests. The details of the manner of treatment of these two plots are as follows:—

Penetration Laykold on Limestone Rubble.—Two inches of limestone rubble screened to remove fines up to half an inch, and coarse more than one and a half inches laid on graded and rolled natural surface, and well rolled after laying. Penetrated with 1gall. to square yard; the ½in. screenings spread, and the whole well rolled. Second coat, ¼gall. per square yard applied, then sanded and well rolled.

Colas and Laykold on Limestone Rubble.—Same as above, but using Colas for penetration coat and Laykold for top coat.

It is evident that this type of construction would require periodical re-dressings, which would result in high maintenance costs.

2a. Bitumastic Sheeting.

This type of construction was also included in the experimental plots and method of construction is as follows:—

Malthoid Heavy.—Five rolls were laid on dry, graded, and rolled natural surface, with 2in. side laps and 4in. end laps. Joints sealed with hot floatine applied with brush. Approximate cost per quarter acre (5-ply), £130. This method of construction gave a quick run-off, and at the end of 17 months was in good condition. It is doubtful, however, whether the base of any form of bitumastic sheeting could be preserved in its original condition for any extended period, owing

to the weathering of the basic material and loss of volatile oils during successive periods of high temperature as may be experienced in the Far Northern districts. Strict attention to maintenance and repeated re-dressing would no doubt extend the life of the material. A loss of tensile strength of the material would make treatment more difficult, and maintenance cost would progressively increase.

2b. Galvanized Iron.

Method of construction (extracted from brochure prepared by Mr. A. S. Kenyon) is as follows:—

The site is prepared by grading to a uniform slope and even surface. For the catchment 6ft. x 3ft. sheets of galvanized plain iron of 26 gauge are used, the sides bent up 1½in. The sheets are laid on the ground in rows in the direction of the slope (a sheltered position is preferable). The overlap varies, being 4in. for slopes up to 1 in 20, and less when steeper. Alternate rows start and end with half-length sheets so that all lap joints are staggered. The longitudinal rows are fastened together by punching a ½in. square hole through the bent-up edges with a special tongs punch which clamps the edges together. This forms a strong and extremely economical joint, which has the advantage of being readily opened should it be necessary to make repairs or insert new sheets.

At a cross-line two sheets from the upper end, the whole catchment is fastened to a timber sill which is bedded in the ground. This allows for the necessary expansion of the iron without any creeping down hill. Around three edges, the top and two sides, the catchment is similarly secured by nailing to logs. The catchment on the lower end discharges into a drain leading to the storage tank.

Consideration should be given to the nature of the soil upon which the iron is to be laid, and if considered necessary a tar or bitumen coating or other form of preservative applied; when the ground is thoroughly dried out, no corrosive action would be expected. A cut-off trench immediately above catchment would remedy any tendency for ground water to flow under the catchment area. A margin should be allowed around the catchment to give room for planting trees to prevent sand drift, and to give protection from winds. The whole to be suitably fenced.

Size of Catchment.

As the use of artificial catchments may be considered to be in the experimental stage, it is advisable to keep the initial outlay as low as possible, and for this reason consideration has been given to the quarter acre (1,210 sq. yds., including the area of tank roof) as the unit section. The adoption of a relatively small area for the catchment has the advantage that a suitable location can be more readily selected, and experience of practical value obtained with a minimum initial outlay. In some instances a single unit might so restrict the period of water carting that it would not be considered a great inconvenience to the occupant, but if a second unit is required advantage may result in its location at another part of the section. Standardisation would facilitate the work being done by contract with expectations of keen competition in respect to prices, to the advantage of the settler.

TANKS.

The type of tank adopted will depend on conditions at the site. An ample supply of suitable stone would permit the construction of a masonry tank or the lining of an excavation to form a storage. When the grade of the catchment site is suitable a tank built on the surface would be preferable, the pipes from the collecting drain at the lower end of the catchment leading into the top of the tank. This arrangement would obviate raising water by a hand pump and the consequent attention to fill troughs which could be controlled by float valves.

Excavated Tanks.

An excavated tank for the storage of 35,000galls. would have internal dimensions of, say, 48ft. x 25ft. at top water level, and 30ft. x 7ft. at bottom, with a maximum depth of 9ft. of water. If masonry or concrete lined, allowance is to be made for thickness of lining.

For masonry work the stone should be well bedded in lime or cement mortar, and after completion water-proofed by painting with a tar of bituminous compound.

For concrete lining the mix should be, say, 1 part of cement to 2½ parts of sand and 6 parts of broken stone. The cement used should be perfectly dry and free from any hard lumps; the sand clean and graded from fine to coarse; and the stone broken to pass a 1½in. ring gauge, graded, and the whole rejected by a ⅛in. screen. All the ingredients should be turned over dry three times, then mixed with water, using the least amount that will produce a workable mixture, then well tamped into position within 15 minutes of mixing.

For lining with Malthoid the material should be laid on an even surface of excavation. At 3in. lap to join strips, using hot floatine or similar material for jointing, the top to be secured.

Surface Tanks.

Masonry Tank.—A masonry tank built on the surface would be about 35ft. internal diameter by about 6ft. 6in. deep to suit stone available, the stone to be well bedded in lime or concrete mortar, painted inside to make impervious.

Concrete Tank.—A concrete surface tank would require forms and steel reinforcements, and would require skilled labour.

Squatter's Tank.—The squatter's tanks are standard construction made in sections for erection on site.

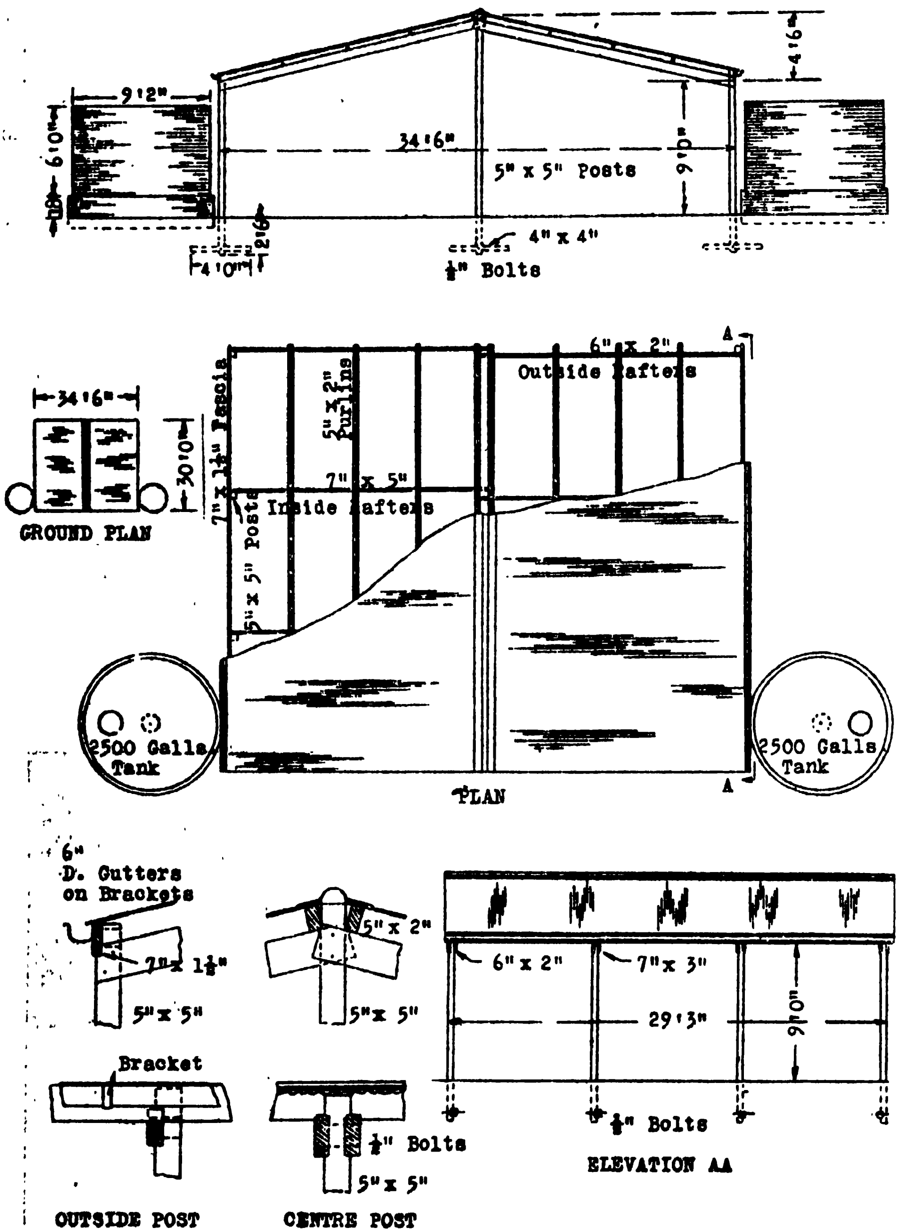
Designs of each typical tank could be prepared together with specifications to cover all details of work. Connection between catchment and tank may be either a concrete or metal drain at the bottom end of the catchment with openings to allow water to enter the excavated tank, or by pipe to surface tank.

SETTLER'S SHED WITH TANKS.

Gable Type.

Scale, 8ft. to 1in.

Design approved by State Bank Board, 17/8/28.

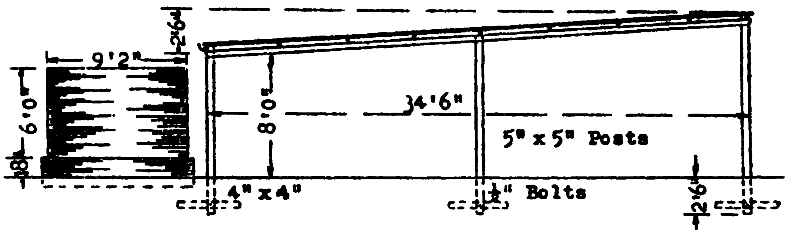


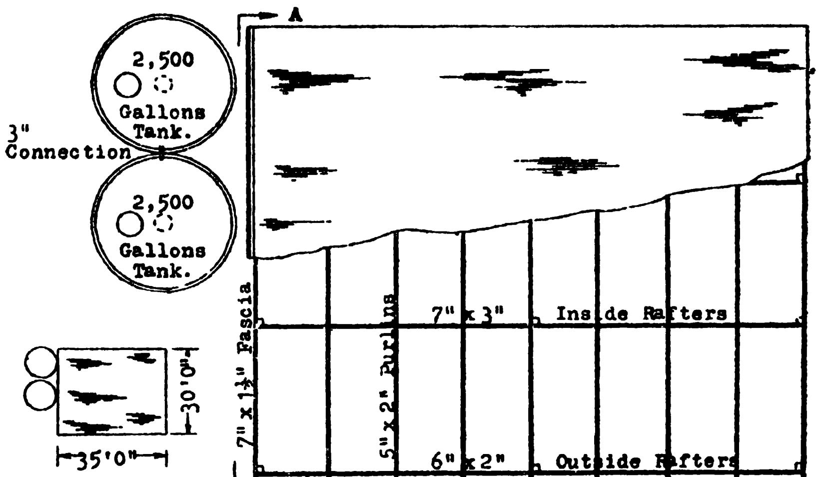
SETTLER'S SHED WITH TANKS.

Lean-to Type.

Scale, 8ft. to 1in.

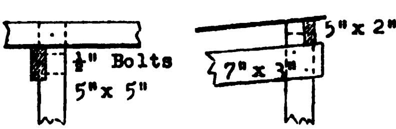
Design approved by State Bank Board, 17/8/28.



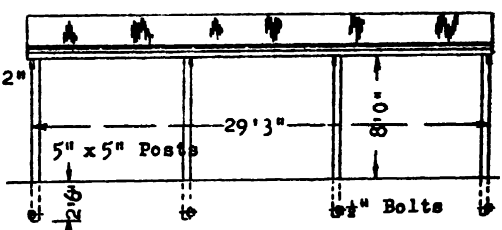


GROUND PLAN

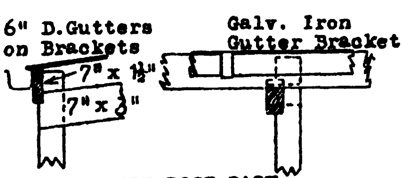
PLAN



OUTSIDE POST FRONT



ELEVATION AA



OUTSIDE POST BACK

ESTIMATES.

In the following estimated costs the prices of material have been taken at the rates at which settlers could expect to purchase for cash from retail firms.

The estimates are intended to be typical only, and are subject to modification to agree with any special local conditions. A general allowance of 150 miles railage from Port Lincoln and 12s. per ton cartage from the railway station has been assumed for arriving at the cost of transport of materials.

The approximate estimates are as follows:—

"Ironclad" Artificial Catchment.

(Using 26-gauge galvanized flat sheets.)

Area (including area of tank roof) ¼ acre.

	£	s.	d.	
Materials—				
Sheets, 6ft. x 3ft. (640 required), 4 tons at £25 10s.	102	0	0	
Jarrah, 4in. x 2in., 90ft. at £1 10s. per 100	1	10	0	
Jarrah pegs, 4in. x 4in. x 1ft. 6in., 46 at 11d.	2	2	0	
Cement, 10 bags at 6s.	3	0	0	
Sundries	0	10	0	
Sales tax on cement and jarrah	0	7	0	
	£109	9	0	say £110
Transport—				
Freight to Port Lincoln	6	5	0	
Railage	8	10	0	
Cartage	3	0	0	
	£17	15	0	say £18
	(including cartage, £3)			
Labour—				
Clearing and grading site	5	0	0	
Fixing jarrah pegs and sill	1	10	0	
Cutting and placing holding-down logs (using local timber)	6	0	0	
Laying down sheets to form catchment (including bending, punching, and fastening)	6	0	0	
Constructing concrete drain (allowing for obtaining sand and stone locally)	6	0	0	
Allowance for plant and tools	1	10	0	
	£26	0	0	

Tank.

Concrete-lined Excavated Tank, capacity 35,000galls., internal dimensions at top water level, say, 48ft. x 25ft., at bottom 30ft. x 7ft., with 9ft. maximum depth of water. Corrugated galvanized iron roof with fall to centre, supported on 4in. x 1¾in. steel joists.

	£	s.	d.	
Materials—				
Cement, 202 bags at 5s. 6d.	55	11	0	
Bitumen filler (2 coats on concrete), 15galls. at 9s. 6d.	7	3	0	
Sundries	5	0	0	
Sales tax	3	2	0	
	£70	16	0	say £71
Transport—				
Freight and railage	20	0	0	
Cartage	5	0	0	
	£25	0	0	

(including cartage, £5)

Labour—

	£	s.	d.	
Excavation, 220 cub. yds. at 5s.	55	0	0	
Stone (including collecting, breaking, and carting), 38 cub. yds.) at 12s.	22	16	0	
Sand (including collecting, washing and carting), 23 cub. yds. at 8s.	9	4	0	
Mixing and placing concrete, 45 cub. yds. at 10s.	22	10	0	
Painting surface with filler, 180 sq. yds. at 3d.	2	5	0	
	£111	15	0	say £112

TANK ROOF.

Materials—

	£	s.	d.	
Steel joists, 16/26ft. lengths, 18.6cwts. at 18s.	16	15	0	
Galvanized corrugated iron, 26 gauge, 90/9ft. sheets ..	17	3	0	
Timber around edge	1	13	0	
Bolts and nuts, 95lbs. at 4d.	1	12	0	
Sales tax	1	0	0	
	£38	3	0	say £38

Transport—

	£	s.	d.	
Freight and railage	8	14	0	
Cartage	1	4	0	
	£9	18	0	say £10

(including cartage, £1)

Labour—

Erecting roof	—	say £6

ALTERNATIVE.

Squatter's Tank (capacity 35,000galls.) for ¼ acre catchment. Galvanized iron roof but no bottom, black iron sides, painted with Siderosthen.

Materials—

	£	s.	d.
Squatter's tank	90	0	0
Inlet pipe, 2in. galvanized wrought iron, 1½ chains	5	0	0
Connections, outlet pipe, valve, &c.	5	0	0
Siderosthen bituminous paint, 2 coats on sides	2	0	0
Sales tax	5	0	0
	£107	0	0

Transport—

	£	s.	d.
Freight and railage	4	10	0
Cartage	0	10	0
	£5	0	0

(including cartage, 10s.)

Labour—

	£	s.	d.	
Levelling surface, 60 cub. yds. at 2s. 6d.	7	10	0	
Erecting tank	5	0	0	
Fixing inlet, &c.	0	10	0	
Painting	1	18	0	
	£14	18	0	say £15

CLAY BOTTOM.

Labour	—	say £8

OR CONCRETE BOTTOM IN LIEU OF CLAY BOTTOM.

(4in. thick, allowing for stone and sand to be obtained locally.)

Materials—

	£	s.	d.	
Cement, 92 bags at 5s. 6d.	25	6	0	
Sundries	2	0	0	
Sales tax	1	5	0	
	£28	11	0	say £29

	£	s.	d.	
Transport—				
Freight and railage	9	4	0	
Cartage	2	4	0	
	£11	8	0	say £11
	(including cartage, £2)			

	£	s.	d.	
Labour—				
Stone (collecting, breaking, and carting), 10½ cub. yds. at 12s.	6	6	0	
Sand (collecting, washing, and carting), 7 cub. yds. at 8s.	2	16	0	
Mixing, placing, &c., 13½ cub. yds. at 10s.	6	15	0	
	£15	17	0	say £16

Summary of Alternative Estimates.

A.—Catchment and Lined Excavated Tank.

	£
"Ironclad" artificial catchment materials	110
Concrete-lined tank materials	109
Transport of materials (omitting cartage)	44
Labour—Catchment, £26; tank, £118	144
Supervision	20
	£427

B1.—Catchment and Squatter's Tank (sides black iron painted, top galvanized corrugated iron, clay bottom).

	£
"Ironclad" artificial catchment materials	110
Squatter's tank materials	107
Transport of materials (omitting cartage)	20
Labour—Catchment, £26; tank, £15; bottom, £8	49
Supervision	14
	£300

B2.—Catchment and Squatter's Tank (as above, but concrete bottom).

	£
"Ironclad" artificial catchment materials	110
Squatter's tank (as above), £107; cement, £29	136
Transport of materials (omitting cartage)	29
Labour—Catchment, £26; tank, £15; bottom, £16	57
Supervision	16
	£348

The above estimates do not include the cost of carting iron, timber, and cement, which the settler could always provide for, but allow for all other anticipated labour costs. Usually, however, this also could be provided by the settler, and the following estimates are, therefore, given as an indication of the minimum amount for which a handy settler could secure the suggested water supply if he were able to supply all labour required and was only required to pay for materials:—

A.—Catchment and Lined Excavated Tank.

	£
"Ironclad" artificial catchment	110
Concrete-lined tank	109
Transport	44
	£263

B1.—Catchment and Squatter's Tank.

	£
"Ironclad" artificial catchment	110
Squatter's tank (black iron sides, clay bottom)	107
Transport	20
	£237

B2.—Catchment and Squatter's Tank.

	£
"Ironclad" artificial catchment	110
Squatter's tank (black iron sides, concrete bottom)	136
Transport	29
	£275

If the settler is unable to pay in cash for these improvements, the following table gives the amounts at which the capital costs of the different schemes could be repaid if a loan were granted the settler, repayable in 60 equal instalments due every six months, with interest at 5 per cent. per annum. On £100 the half-yearly instalment at 5 per cent. equals £3 4s. 8.5d. The following amounts are calculated proportionately:—

	Scheme A.			Scheme B1.			Scheme B2.		
	£	s.	d.	£	s.	d.	£	s.	d.
Estimated cost with labour	427	0	0	300	0	0	348	0	0
Half-yearly instalment	13	16	3.6	9	14	1.4	11	5	2.2
Estimated cost without labour	263	0	0	237	0	0	275	0	0
Half-yearly instalment	8	10	2.1	7	13	4.3	8	17	11.3

NITROGEN IN RELATION TO CEREAL CULTURE.

[By A. E. V. RICHARDSON, M.A., D.Sc., and H. C. GURNEY, M.Sc., Waite Agricultural Research Institute, University of Adelaide.]

[Paper read before the Australian and New Zealand Association for the Advancement of Science, Melbourne, January, 1935.]

The remarkable response of Australian soils to soluble phosphates has in the past led to an intensive study of the phosphate problem, and the investigation of the response of crops and pastures to various forms and quantities of phosphatic fertilisers.

Partly owing to this circumstance, and partly owing to the fact that in Australia wheat is usually grown on a well prepared bare fallow, which is normally unresponsive to nitrogen, comparatively little attention has hitherto been given to the role of nitrogen in cereal culture. Wheat is the most important of the cultivated crops of Australia, and the area annually sown averages 15 million acres. Whilst the greater part of the wheat belt lies within the 10-20in. line of rainfall, quite a considerable portion has a rainfall of over 20in., of which 70-80 per cent. falls during the growing period of the crop—May to November.

The climate of the wheat belt is mainly of the Mediterranean type with marked seasonal winter rainfall and a long period of summer drought. This is particularly true of the wheat areas of Western Australia, South Australia, and a substantial portion of Victoria and New South Wales.

The normal practice in the older settled areas of the wheat belt is to precede the wheat crop with a well worked bare fallow. The benefits of fallowing ([1]) in areas of light to moderate rainfall are explained on the following grounds—(*a*) conservation of soil moisture, (*b*) accumulation of nitrate nitrogen in the fallow, (*c*) reduction of competition with weeds, (*d*) promotion of tilth and a firm seed bed. A further practical advantage is that it tends to distribute the work of the farm evenly throughout the year and enables the grower at seed time to have large areas of clean land, appropriately tilled when the seasonal rains commence.

Moisture conservation is important in regions of moderate rainfall, since the extra moisture conserved by bare fallowing may represent a considerable proportion of the soil moisture actually "available" for the crop, *i.e.*, the amount of soil moisture in excess of that at which wilting of the plant occurs. The problem of moisture conservation becomes less important in regions of liberal rainfall (over 20in.) since the seasonal rainfall is usually sufficient for the transpirational demands of heavy crops.

Earlier investigations at the Waite Institute suggested that the nitrogen factor was more important than was formerly supposed.

(1) Comparisons of wheat grown in rotation with peas and with bare fallow showed that over a period of years the yield of wheat after peas was approximately equal to that of wheat after bare fallow.

(2) The application of nitrogen to cereal crops on stubble ploughed land invariably resulted in a substantial increase in yield, whereas the response to nitrogen on fallowed land was negligible.

(3) Comparisons of the moisture and nitrate nitrogen content of the soil at seed time showed that the most striking differences between fallowed and non-fallowed land were to be found in the nitrate-nitrogen content and not in the moisture content of the soil.

(4) Hitherto practically all field experiments with fertilisers for wheat in Australia had been conducted on well prepared fallow which normally contains an abundance of nitrate nitrogen. Under these conditions, *i.e.*, with a high nitrate nitrogen level, the response of phosphates would be marked, but substantial responses to nitrogen could hardly be expected except in wet seasons. Nevertheless, small responses had been recorded at Roseworthy (2) and Booborowie (3) on fallowed land.

For these reasons, a series of investigations was commenced at the Waite Institute in 1928 to determine the response of wheat to varying quantities and forms of nitrogen on fallow and on stubble ploughed land for a period of five years. In 1933, tests with barley and oats on stubble were commenced.

CLIMATIC CONDITIONS.

The Waite Institute is situated 3½ miles from Adelaide near the foothills of the Mount Lofty Ranges.

The climate of the Adelaide district, in common with the greater part of the wheat belt, is of the Mediterranean type with regular winter rainfall succeeded by summer drought.

The mean monthly rainfall and number of rainy days for the five years during which the wheat experiments were conducted are summarised in the following table.

TABLE I.—*Mean Monthly Rainfall and Number of Rainy Days, Waite Institute,* 1928-32.

	Monthly Rainfall.	Rainy Days.
January	·559	6
February	·979	5
March	1·005	7
April	1·919	14
May	2·143	14
June	4·322	21
July	3·716	23
August	2·765	21
September	2·885	20
October	2·109	16
November	·910	10
December	1·069	6
Total	24·381	163
June to November	16·707	111

EFFECT OF NITROGENOUS FERTILISERS ON GROWTH AND YIELD OF WHEAT.

For the five years 1928-32, investigations have been conducted to determine the effect of various quantities of nitrogen on the yield of wheat after bare fallow and after wheat.

The field plots were in all cases replicated six times, the method of plot arrangement throughout the five years being the randomised Latin Square method devised by Fisher (4). The moisture and nitrate nitrogen content of the soil were determined at periodical intervals and census studies were made to correlate differences in yield with observed differences in the crop throughout its growth. The unit plot was a 9-hoe drill strip 5 chains long and $\frac{1}{25}$ acre in area.

In order to remove the possible influence of phosphoric acid as a limiting factor to production, a basal dressing of 288lbs. superphosphate per acre was applied with the seed to all wheat plots in each year of test.

EFFECT OF SULPHATE OF AMMONIA ON YIELD OF WHEAT.

The mean yields of total produce (grain and straw) and grain for each of the five years 1928-32 and the average yields of each treatment are summarised in the table.

TABLE II.—*Effect of Various Quantities of Sulphate of Ammonia on Yield of Wheat when Grown after*—(a) *bare fallow,* (b) *wheaten stubble (stubble ploughed land), Waite Institute,* 1928-32.

Quantities of Sulphate of Ammonia.	Total Produce.*		Grain.†	
	Mean 1928-32	Mean increase due to Nitrogen.	Mean 1928-32	Mean increase due to Nitrogen.
	(cwt. per acre)		(bush. per acre)	
Sown after Stubble				
A No Nitrogen	47·5	—	36·56	—
B ½ cwt. at seeding	52·7	5·2	39·72	3·16
C 1 cwt. at seeding	57·4	9·9	41 95	5·39
D 2 cwts. at seeding	66·5	19·0	45·69	9·13
E 1 cwt. in spring	55·1	7·6	40·50	3.94
F 1 cwt. at seeding, 1 cwt. in spring	64·8	17·3	45·07	8·51
Sown after Fallow—				
A No Nitrogen	70·3	—	49·09	—
B ½ cwt. at seeding	73·3	3·0	50·58	1·49
C 1 cwt. at seeding	74·3	4.0	50·47	1.38
D 2 cwts. at seeding	75·8	5·5	49·77	·68
E 1 cwt.in spring	73·0	2·7	49·46	·37
F 1 cwt. at seeding, 1 cwt. in spring	75·2	4·9	49·28	·19

* *Statistical analysis shows that the value of z for treatments is significant. The standard error of the difference between these means value for* 1928-32 *is* 1.47 *bushels.*

† *Statistical analysis shows that the value of z for treatments is significant. The standard error of the difference between these means values for* 1928-32 *is* 1.03 *bushels.*

It will be seen that whilst the sulphate of ammonia had no appreciable effect in increasing the mean yield of grain with wheat after bare fallow, it had a marked effect on both total produce and grain with wheat after wheat.

An application of ½cwt. of sulphate of ammonia gave a mean increase in yield of 5.2cwts. total produce or hay and 3.16bush. grain. Similarly an application of 1cwt. per acre gave increases of 9.9cwts. of total produce and 5.39bush. per acre of grain. Both these applications were profitable with current or with mean prices for wheat and fertiliser.

The profit resulting from the application of sulphate of ammonia on the basis of these results is dependent upon the relative prices of grain and total produce (wheaten hay) on the one hand, and the cost of the fertiliser on the other. The relationship between profit per acre and wheat and fertiliser prices is shown in the diagram of the solid model.

The upper surface of the model indicates the amount of net profit per acre resulting from the application of 1cwt. sulphate of ammonia with prices of wheat ranging from 2s. 6d. to 5s. per bushel, and with sulphate of ammonia at prices ranging from 13s. to 9s. per cwt.

As the price of wheat decreases and the price of fertiliser increases, the amount of profit from the use of the fertiliser falls. Conversely, as wheat prices increase and fertiliser prices decrease, the profit per acre from any given application increases.

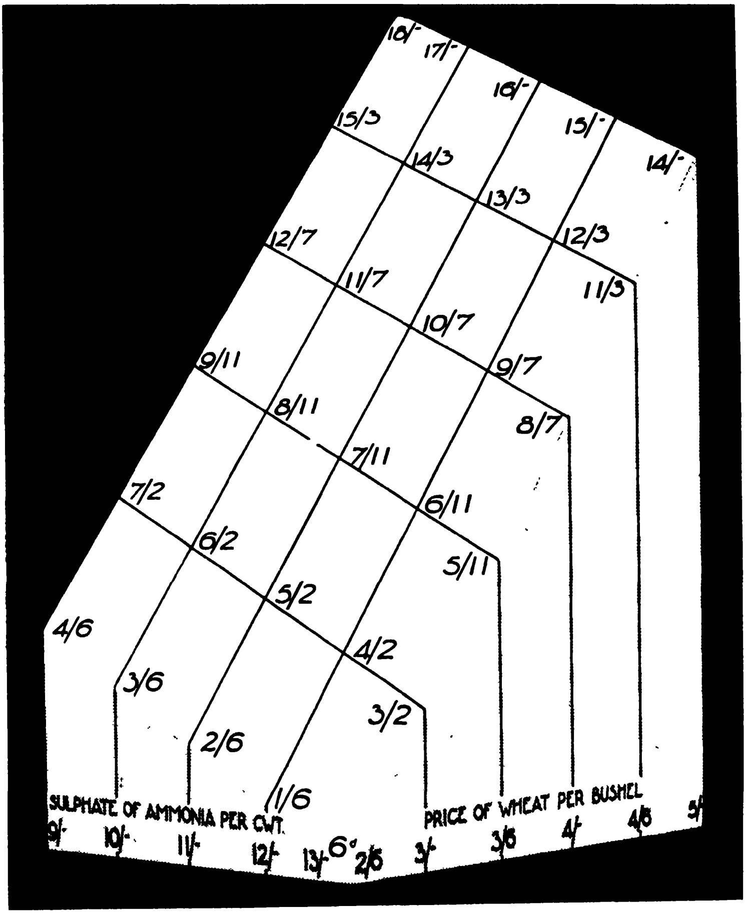


Figure 1.—Photograph of solid model showing on upper surface the net profit per acre from an application of 1cwt. of sulphate of ammonia, with varying prices for the fertiliser and for wheat.

EFFECT OF EQUIVALENT QUANTITIES OF NITROGEN IN VARIOUS FORMS OF FERTILISERS.

Investigations were conducted over five seasons (1928-32) to determine the effect of equivalent quantities of nitrogen (23.4lbs. nitrogen per acre) as nitrate of soda, sulphate of ammonia, nitro-chalk, urea, and diammonium phosphate.

Six replicates of each treatment were sown in the form of a randomised Latin square. A basal dressing of superphosphate was applied with the seed at the rate of 288lbs. per acre to all plots except those receiving diammonium phosphate.

The results for the five seasons are summarised in Table III.

TABLE III.—*Effect of Equivalent Quantities of Nitrogen (23.4lbs. per acre) applied in the form of Nitrate of Soda, Sulphate of Ammonia, Nitro-Chalk, Urea, and Diammonium Phosphate on Yield of Wheat after Wheat, Waite Institute,* 1928-32.

Treatment.	Total Produce. (Cwts. per Acre.)	Grain. (Bush. per Acre.)	Mean Increase due to Nitrogen.	
			Total Produce. (Cwts.)	Grain. (Bush.)
No nitrogen	33·02	27·99	—	—
Nitrate of soda	45·50	35·62	12·48	7·63
Sulphate of ammonia	42·67	33·77	9·65	5·78
Nitro-chalk	43·35	34·12	10·33	6·13
Urea	42·00	33·14	8·98	5·15
Diammonium phosphate	39·23	30·82	6·21	2·83

Statistical analysis shows that the value of ~ for treatments is significant. The standard error of the difference between the mean values for grain for 1928-32 *is* .81*bush.*

From the results over five seasons we may conclude that—

(1) nitrate of soda gives the largest increase, both in hay and in grain yields;

(2) there is no significant difference in the increases given by sulphate of ammonia, nitro-chalk and urea; the increase given by these three being not so great as that obtained with nitrate of soda;

(3) diammonium phosphate gives the smallest increase.

All plots (except the no nitrogen controls) received equivalent amounts of nitrogen (23.4lbs. per acre). All plots, including the controls, received an equivalent dressing of phosphoric acid. The differences in yield over the no nitrogen controls measure the efficiency of the various fertilisers on an equivalent nitrogen basis. Nitrogen in the readily available form of nitrate of soda gave the highest mean return.

In assessing the values of the yields, it must be borne in mind that whereas the amount of nitrogen applied per acre was the same, the actual quantities of fertiliser needed to supply equivalent weights of nitrogen varied considerably. The following quantities of the various fertilisers were used to supply equivalent quantities of nitrogen (23.4lbs. per acre), viz., nitrate of soda 150lbs., nitro-chalk 150lbs., urea 50lbs., sulphate of ammonia 112lbs., and diammonium phosphate 112lbs. The standard dressing of 1cwt. of sulphate of ammonia per acre gave over a five-year period an increased yield of appoximately 10cwts. hay or 5¾bush. wheat per acre, increases approximately the same as those recorded for the previous experiment (Table II.).

The comparatively low yield of the plots receiving diammonium phosphate was due to the fact that in the first two seasons (1928-29) this fertiliser was sown broadcast.

Investigation ([6]) showed that when diammonium phosphate was drilled with the seed there was no significant difference in the yield between diammonium phosphate and an equivalent amount of phosphoric acid and nitrogen applied in the form of superphosphate and sulphate of ammonia.

MOISTURE AND NITRATE NITROGEN CONTENT OF THE SOIL AT SEEDING AND AT HARVEST.

During 1929-32 the moisture and nitrate nitrogen contents of the soil on fallow and stubble ploughed land were determined at critical periods during the growth of the crop. In all cases the soil and subsoil were sampled at four depths, namely, 0-9in., 9-18in., 18-27in., 27-36in., and for each sampling 12 holes were bored to a depth of 3ft. The wilting point of each layer was determined according to the method described by Briggs and Shantz (6) by growing wheat in ten replicated series of pots and observing the point at which permanent wilting took place in a saturated atmosphere. The moisture and nitrate nitrogen content of the stubble and fallow soils at seeding for each year are summarised in Table IV.

TABLE IV.—*Mean Moisture and Nitrate Nitrogen Contents of Soil to a depth of 3ft. on a Bare Fallow and Stubble Ploughed Soil at Seeding and Harvesting of Wheat,* 1929-32.

	Moisture Content.		Nitrate Nitrogen.	
	Fallow.	Stubble.	Fallow. Parts per Million.	Stubble. Parts per Million.
	%	%		
At seeding	21·95	20·4	8·5	4·8
At harvest	12·7	13·1	2·2	2·5

The mean moisture content of the fallowed soil at seeding for four seasons was 21.95 per cent. as compared with 20.4 per cent. for the stubble ploughed soil. Seeding normally takes place in June. This difference is equivalent to .6in. of rain. The moisture really available for the wheat crop is that above the point at which permanent wilting takes place, which for the first 3ft. averages 15.6 per cent. The growing crop used up all the moisture which fell as rain (about 16.7in. during the growing period), and in addition reduced the moisture content of the fallow to 12.7 per cent. at harvest and that of the stubble ploughed land to 13.1 per cent.

The most striking difference, however, between the fallow and the stubble ploughed land at seeding was not in the moisture content, but in the nitrate nitrogen content. The mean nitrate nitrogen content of the fallow soil at seeding was 8.5 parts per million to a depth of 3ft., as compared with 4.8 parts per million for the stubble ploughed soil. The difference in favour of the fallow was therefore 3.7 parts per million of nitrate nitrogen equivalent to 34.4lbs. per acre of nitrogen, or approximately 1½cwts. per acre of sulphate of ammonia. In other words, the fallow soil at seeding has an available nitrogen supply equivalent to 1½cwts. of sulphate of ammonia per acre, over and above that of the stubble ploughed soil, apart from the additional advantage of extra moisture equivalent to .6in. of rain.

It will be noted that at harvest the values for nitrate nitrogen on both types of soil are practically the same.

The graphs show that the fallow soil at seeding has a larger supply of available moisture and particularly of nitrate nitrogen than the stubble soil. After the two soils have produced their crops (December) the nitrate and moisture contents of both soils are practically identical, the larger crop on the fallow having removed the extra supply of nitrate and moisture. Further, the graphs indicate that the two factors are not of equal importance, the lack of nitrate in the stubble soil being relatively

more serious than the lack of moisture. The deficiency in nitrates may be made good by the application of nitrogenous manures but only up to the limit of the moisture supply. The latter, of course, will vary with the rainfall of the region.

CENSUS STUDIES ON WHEAT.

Census studies on the growing crop were made during the three years 1930-32 on the wheat grown on stubble land to determine the effect of sulphate of ammonia on plant establishment, tillering, percentage survival of tillers and ear characters.

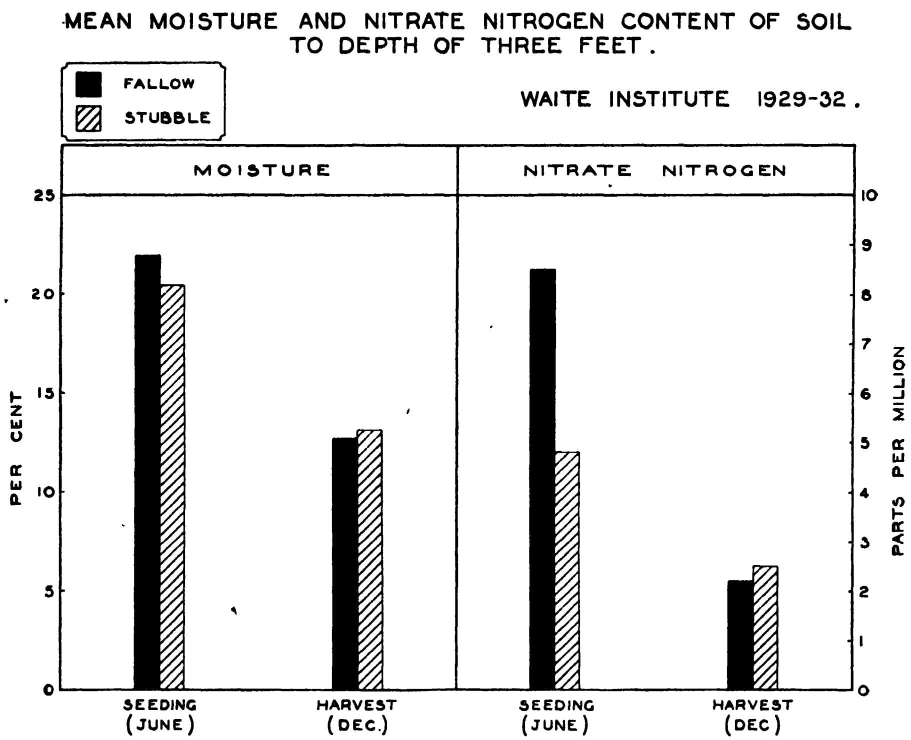


Figure 2.—Graph showing the mean moisture and nitrate nitrogen content of the soil to a depth of 3ft. on (1) fallow, (2) stubble, at seeding (June), and at harvest (December), for seasons 1929-32.

For purposes of comparison, similar records were also made on the no nitrogen plots on fallow. The technique employed consisted of sampling from a systematised scatter of foot-lengths of drill row in each plot to be studied: 18 samples were taken from each of the six replications, making 108 samples for each treatment. The positions of the foot lengths were marked with light jarrah stakes and numbered pegs, and throughout the sampling the foot-length was taken as the unit.

The results for the seasons 1930-31-32 are summarised in the following table.

TABLE V.—*Results of Census Studies on the Growth of Wheat on Fallow and Stubble Land, with and without Nitrogenous Manures, Waite Institute,* 1930-32.

Treatment.	No. of Grains Sown per Foot.	No. of Plants at Tillering Stage per Foot.	No. of Tillers at Maximum Tillering per Foot.	Ear-bearing Tillers at Harvest per Foot.	Final Yield in Bushels per Acre.
1. Stubble, no nitrogen	9·3	7·6	24·2	12·2	34·6
2. Stubble, 2cwts. Sulph. of ammonia	9·3	7·5	39 0	16·6	44·9
3. Fallow, no nitrogen.	9·3	6·8	35·0	17·5	44·3

Plant establishment, that is the average number of plants per foot-length of row, was found to be slightly better on stubble land than on fallow land. This was due mainly to the fact that with the liberal rainfall characteristic of the seeding period (June) at the Waite Institute, the tilth of the soil is normally better on the stubble than on the fallow soil. The main effect of sulphate of ammonia on wheat grown on stubble was to cause a vigorous burst of tillering, which is almost entirely responsible for the increased yield.

The percentage survival rate of the tillers producing ears is lowered by dressings of sulphate of ammonia. Over a period of three seasons with the plots receiving no nitrogen, 50 per cent. of the tillers observed at maximum tillering produced ears. The plots receiving sulphate of ammonia on stubble produced the greatest number of tillers during September, but only 42.5 per cent. of the tillers survived to produce ears.

Were it not for the lowering of the survival rate, we should expect much larger increases in yields from nitrogen treated plots on stubble. The mortality among the tillers produced with nitrogen on stubble is so much higher than among the tillers on the fallow, that the final yields per acre are brought closer together than one would expect from the number of tillers present at the maximum tillering stage.

The number of ear-bearing tillers at harvest is almost directly related to the yield.

Sulphate of ammonia increases the length of ear on stubble although not the length of the ear on fallow. No significant differences appear to occur in the weight of grain per ear.

EFFECT OF SULPHATE OF AMMONIA ON BARLEY AND OATS.

Wheat occupies a dominant position in South Australian agriculture. It provides the main source of income for thousands of farmers, and the success of the crop largely influences the financial position of the grower. It is not unnatural therefore to find that wheat receives preferential treatment in respect to cultivation over other cereals. Whatever bare fallow is available is rightly devoted to wheat, and oats and barley are almost invariably and necessarily sown on land more or less hastily prepared in the autumn from stubble or temporary pasture.

Investigations with wheat recorded above have shown that at harvest the moisture content of the soil under the wheat crop is reduced below the wilting point and that practically the whole of the available nitrate nitrogen has been used up by the crop. The dry soil conditions which normally follow the harvest in the South Australian environment are unfavourable for fresh supplies of nitrate nitrogen to be formed in the soil until the seasonal break in the weather occurs in the late autumn. Consequently, oats and barley grown on such stubbles cannot produce heavy yields even with liberal dressings of superphosphate on account of

the low nitrate nitrogen level of the soil. If, however, the necessary nitrogen is applied as fertiliser, it is frequently possible, at least in the Adelaide environment, to raise the yield either of oats or of barley to a level approaching that obtained from a well worked bare fallow.

In view of the fact that the greater part of the barley and oats are normally sown on stubble ploughed land, it would appear that the possibility of increasing the yields of barley and oats on stubble by the use of dressings of nitrogen should be thoroughly tested.

On the permanent manurial plots at the Waite Institute it was found that a dressing of 12½lbs. nitrogen per acre (equivalent to 60lbs. sulphate of ammonia), either in the form of sulphate of ammonia or of nitrate of soda, increased the yield of barley over a period of eight years by 4.8bush.

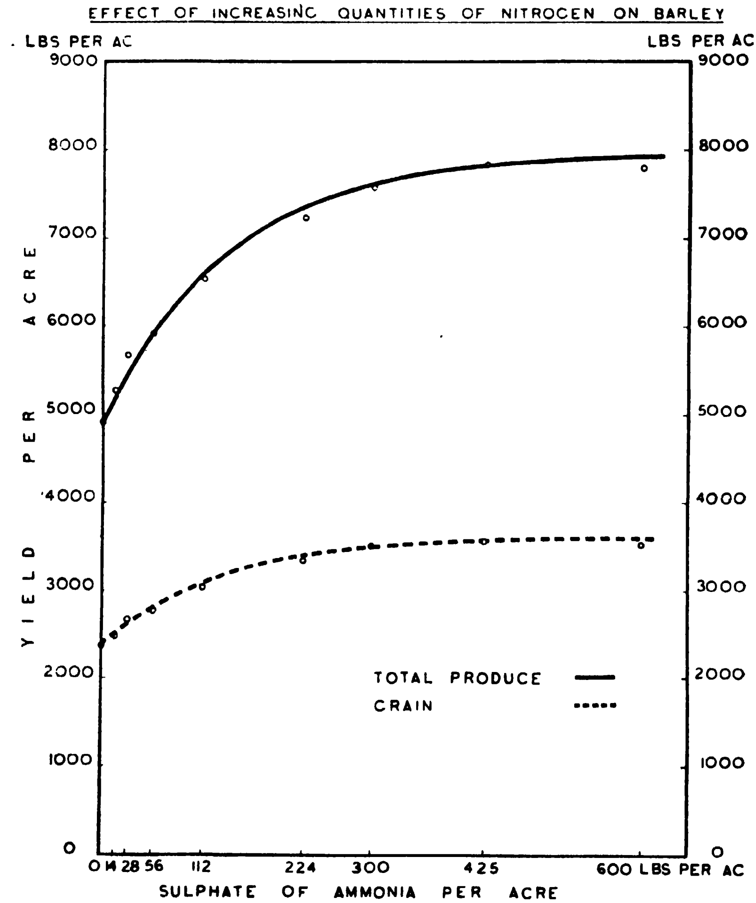


Figure 3.—Graph showing relationship between the quantity of sulphate of ammonia applied per acre and yields of total produce and grain.

A comprehensive test was therefore designed in 1930 to determine the effect of sulphate of ammonia on barley in quantities ranging from 14lbs. to 600lbs. per acre. Nine manurial treatments with nine randomised replications of each treatment were sown in the form of a Latin square. The plots were sown on the stubble of an unmanured oat crop grown in 1929. To remove the possibility of soluble phosphate being a limiting factor to nitrogen, the whole of the plots were treated uniformly with a basal dressing of 288lbs. superphosphate drilled in with the seed.

The results of this investigation have already been recorded ([6]), and a brief summary is shown in the attached graph.

Without nitrogen, but with the basal dressing of superphosphate, the yield per acre was 47.5bush. The increased grain yields over the no nitrogen controls with dressings of ½cwt., 1cwt., and 2cwts., were respectively 8.1bush., 13.4bush., and 19.5bush per acre. These increases were very profitable, and demonstrated very clearly that in the Adelaide environment there were great possibilities of increasing barley yields by moderate applications of sulphate of ammonia. The results of this quantitative test showed that the increments in yield due to successive moieties of sulphate of ammonia became progressively smaller and furnished an interesting example of the Law of Diminishing Return ([7]).

Mitscherlich ([8]) attempted to formulate a law for plant yield based upon the relation between the yield of the crop and the intensity of the environmental factor (fertiliser). According to Mitscherlich, if all the conditions were ideal a certain maximum yield would be obtained, but in so far as any essential nutrient is deficient, there is a corresponding shortage in the yield. Further, the increase in crop yield produced by a unit increment of the lacking factor, in this case nitrogen, is proportional to the decrement from the maximum attainable yield.

If A is the maximum yield obtainable when the lacking factor is present in excess, and y = yield when x = the amount of fertiliser added, then

$$\frac{dy}{dx} = A - y \text{ or } \operatorname{Log} (A - y) = C - kx.$$

Figure III. shows graphically the relationship between the yields of total produce and grain of barley and the quantities of sulphate of ammonia applied to produce the yield.

The calculated yields as determined by this equation, were found to agree fairly closely with the yields actually observed for quantities of sulphate of ammonia ranging from 0 to 425lbs. per acre. The calculated yields all fell within the limits of the observed values and their mean errors.

Broadly, the observed results show that when adequate amounts of phosphate are available, nitrogen becomes a limiting factor on stubble land, and the yield of barley, both for total produce and grain when fertilised with increasing amounts of sulphate of ammonia, follows the Law of Diminishing Return. In the light of the above investigations, it would appear that the use of sulphate of ammonia offers a means of augmenting the production of feed barley where such is grown on stubble ploughed land, or of increasing the stock carrying capacity of the barley crop if it be used for pasture.

For the production of malting barley the effect of the sulphate of ammonia on the grain must be considered.

It is well known that the "steely" quality of the grain is associated with a high percentage of protein in the grain, and that the "mealy" quality of the grain is associated with a low percentage of protein.

If the application of sulphate of ammonia to barley increases the nitrogen content of the grain to any marked extent, we should expect to obtain poorer malting samples with increasing dressings of the fertiliser. It was shown ([6]) that quantities of sulphate of ammonia up to 56lbs. per acre produced no effect on the nitrogen content of the grain. With an application of 1cwt. and 2cwts. per acre of sulphate of ammonia, the nitrogen content of the grain was raised from 1.50 per cent. (no nitrogen treatment) to 1.59 per cent. and 1.68 per cent. respectively, and the grain was slightly less valuable as a malting sample. Dressings in excess of 2cwts. per acre had an appreciable effect in raising the nitrogen content of the grain and in affecting its value as a malting sample.

In any individual year the nitrogen content of barley grain is subject to variations attributable to the soil on which the crop is grown, the variety, the time of sowing, whilst between two seasons very large differences may be found due to different weather conditions. The differences in nitrogen content of the grain caused by seasonal variations re usually greater than the differences which are obtained by moderate dressings of nitrogen (*i.e.*, up to 1cwt. sulphate of ammonia per acre).

In 1932, two series of field experiments were laid out to determine the effect of sulphate of ammonia on the yield of (1) oats, (2) barley, in a rotation series of wheat, oats, barley, fallow. It is intended to continue the experiments for five years, but the results of the first two seasons' work are sufficiently conclusive to justify recording them at the present stage.

With both barley and oats the same lay-out of plots was used. Thirty-six plots, each consisting of a 9-hoe drill strip 5 chains long, were used in each experiment, and all plots received a basal dressing of 2cwts. superphosphate with the seed. Six manurial treatments were used, each of which was replicated six times in the form of a Latin square.

During each season, tiller counts were made, on both barley and oats, in the manner already described for wheat (*vide supra*). In addition, determinations of the nitrate nitrogen content were made to a depth of 3ft. at various stages of growth on the barley plots.

The rainfall for the two seasons is summarised in the accompanying table.

Table Showing Monthly Rainfall 1933, 1934, *and Number of Rainy Days, together with Rainfall June to November.*

	Monthly Rainfall.		No. of Rainy Days.	
	1933.	1934.	1933.	1934.
January	1·219	·576	11	5
February	·404	·139	4	5
March	1·425	·722	9	8
April	2·091	1·483	8	14
May	6·849	·058	19	3
June	1·799	1·140	20	15
July	2·192	1·180	19	18
August	3·854	4·899	24	21
September	3·709	4·051	21	18
October	·681	2·497	16	20
November	·259	3·793	3	13
December	·423	1·528	8	11
Total	24·905	22·066	162	151
June-November	12·494	17·560	103	105

The two seasons show rather striking differences. In 1933, there was a marked break in the weather in April, and liberal rains fell during the period immediately prior to seeding (June). Winter and early spring rains were satisfactory, but late spring rains were abnormally light.

Almost the antithesis of these conditions was experienced during 1934. The rainfall till the end of July was extraordinarily light, and at no time during the first seven months of the year was the rainfall sufficient in amount to bring about the usual saturation of the soil to a depth of 3ft. Following on this long, dry period, the rainfall from August to November was considerably above the average.

The results of the tests with barley for the two seasons are summarised in the following table.

TABLE VI.—*Showing Effect of Sulphate of Ammonia on—*(a) *Total Produce,* (b) *Grain Yield of Barley.*

Treatment.	Total Produce.*				Grain.†			
	1933.	1934.	Mean for two Seasons.	Increase due to N.	1933.	1934.	Mean for two Seasons.	Increase due to N.
	Cwts. P. Ac.	Cwts. P. Ac.	Cwts. P. Ac.	Cwts. P. Ac.	Bush. P. Ac.	Bush. P. Ac.	Bush. P. Ac.	Bush. P. Ac.
No nitrogen	24·76	20·83	22·80	—	28·71	24·48	26·59	—
½cwt. sulphate of ammonia at seeding	34·24	26·84	30·54	7·74	38·33	30·68	34·51	7·92
1cwt. sulphate of ammonia at seeding	45·72	35·46	40·59	17·79	48·60	39·31	43·95	17·36
2cwts. sulphate of ammonia at seeding	59·27	48·38	53·83	31·03	60·39	51·02	55·70	29·11
3cwts. sulphate of ammonia at seeding	65·95	57·13	61·54	38·74	65·16	58·77	61·96	35·37
1cwt. sulphate of ammonia in spring	44·03	34·78	39·40	16·60	48·23	38·87	43·55	16·96

* *Statistical analysis shows that the value of z for treatments is significant. The standard error of the difference between mean values is .37bush. per acre.*

† *Statistical analysis shows that the value of z for treatments is significant. The standard error of the difference between mean values is 1.37cwt. per acre.*

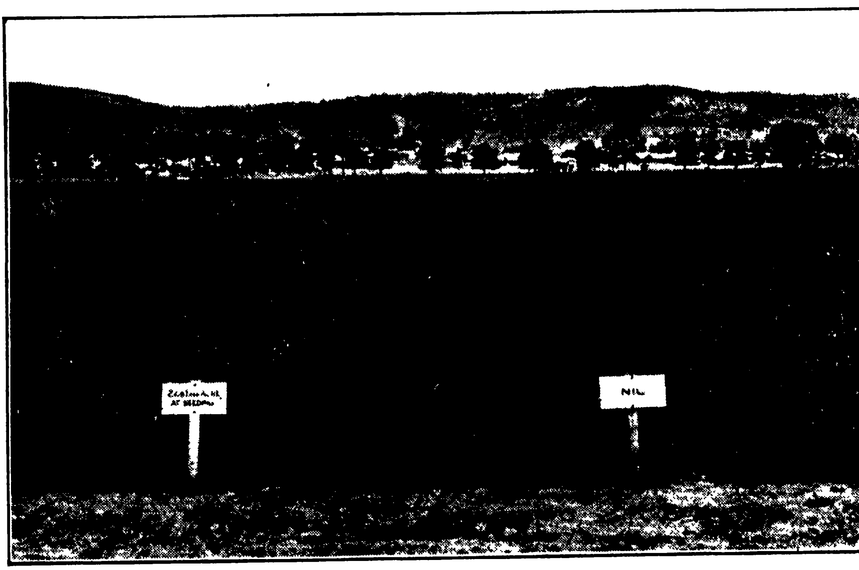


Figure 4.—View of barley plots on stubble ploughed land which received (1) 2cwt. per acre of sulphate of ammonia at seeding, and (2) no sulphate of ammonia.

The effect of sulphate of ammonia on barley, as shown in the above table, is very striking.

Without sulphate of ammonia, the mean yield of total produce for the two seasons was 22.8cwts., and 26.59bush. of grain per acre.

The application of 1cwt. sulphate of ammonia resulted in a yield of 43.95bush. per acre, *i.e.*, an increase due to sulphate of ammonia of

17.36bush. per acre. With 2cwts. per acre sulphate of ammonia, the mean yield was increased to 55.7bush., an increase of 29.11bush. per acre.

The effect of sulphate of ammonia on the yield of oats for the two seasons was no less striking than that shown with barley.

The following table summarises the yield for the two seasons 1933-34:—

TABLE VII.—*Showing Effect of Sulphate of Ammonia on*—(a) *Total Produce,* (b) *Grain Yield of Oats, Waite Institute,* 1933-34.

Treatment.	Total Produce.*				Grain.†			
	1933.	1934.	Mean for two Seasons.	Increase due to N.	1933.	1934.	Mean for two Seasons.	Increase due to N.
	Cwts. P. Ac.	Cwts. P. Ac.	Cwts. P. Ac.	Cwts. P. Ac.	Bush. P. Ac.	Bush. P. Ac.	Bush. P. Ac.	Bush. P. Ac.
No nitrogen	23 37	34·39	28 88	—	34·58	47·24	40·91	—
½cwt. sulphate of ammonia at seeding	31·41	42·49	36 95	8 07	43·49	56 87	50·18	9 27
1cwt. sulphate of ammonia at seeding	43 42	49·39	46 41	17·53	55·13	64·16	59·64	18 73
2cwts. sulphate ammonia at seeding	65·24	56·79	61·02	32·14	77·65	72·37	75·01	34·10
3cwts. sulphate of ammonia at seeding	76·90	63·47	70·18	41 30	85·16	75·49	80·32	39·41
1cwt. sulphate of ammonia in spring	41·08	47·75	44·42	15·54	54·27	63·59	58·93	18·02

* *Statistical analysis shows that the value for z for treatment is significant. The standard error of the difference between mean values for* 1933-34 *is* 1.22*cwt. per acre.*
† *Statistical analysis shows that the value for z for treatment is significant. The standard error of the difference between mean values for* 1933-34 *is* 1.38*bush. per acre.*

Without sulphate of ammonia the mean yield of produce is 28.88cwts. per acre, and 40.91bush. of grain per acre.

An application of 1cwt. sulphate of ammonia increased the yield of total produce by 17.53cwts., and the yield of grain by 18.73bush. per acre. The application of 2cwts. per acre sulphate of ammonia increased the yield of total produce by 32.14cwts., and that of grain by 34.1bush. per acre.

Both with barley and with oats the application of 1cwt. sulphate of ammonia at seeding gave a better return than the application of a similar quantity in spring.

The striking increases in yield of total produce of oats with application of sulphate of ammonia are of special significance to growers in the better rainfall areas, since oats are largely used for hay and are frequently sown on stubble ploughed land or after wheat.

Census studies were made during the two seasons both on the barley and on the oats. The main result of interest was the large increase in the number of tillers in September, both on oats and barley, with liberal dressings of sulphate of ammonia. The results for the two seasons are summarised in Table VIII.

TABLE VIII.—*Showing Results of Census Studies on Growth of Barley and Oats, Waite Institute,* 1933-34.

Census.	Barley. No nitrogen.	Barley. 2 cwts. sulphate of ammonia	Oats. No nitrogen.	Oats. 2 cwts. sulphate of ammonia
1. No. of grains sown per foot-length of drill	9·9	9·9	15·1	15·1
2. Plant establishment per foot	6·0	5·6	10·2	10.0
3. No. of tillers per foot at maximum tillering	21·2	34·7	22·6	41·0
4. No. of ears (Barley) or panicles (oats) per foot at harvest........................	11·7	20·0	14·4	15·3
5. Percentage survival of tillers	55·2%	57·4%	63·7%	37·4%
6. Mean yield of grain (bush. per acre)	26·59	55·70	40·91	75·01

The most interesting features revealed by the census were:—

(*a*) Plant establishment was not significantly affected by the application of 2cwts. of sulphate of ammonia per acre, when the fertiliser is sown broadcast with a drill on the surface.

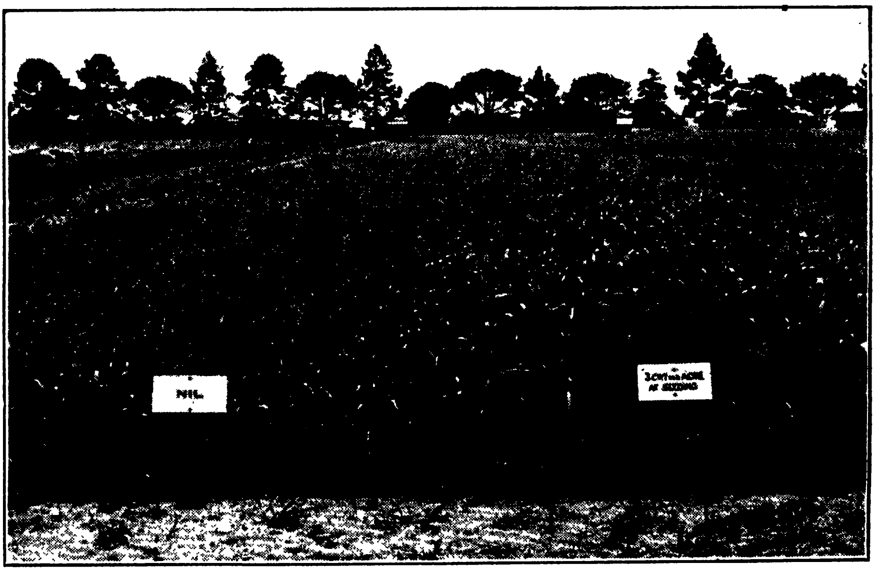


Figure 5.—View of oat plots (14/10/33) on stubble ploughed land which received (1) no sulphate of ammonia, and (2) 3cwt. sulphate of ammonia at seeding.

(*b*) Sulphate of ammonia has a very marked effect in increasing the number of tillers per foot length of row both with barley and with oats. At the period of maximum tillering (September) a dressing of 2cwts. sulphate of ammonia increased the number of tillers by 64 per cent. with barley and 83 per cent. with oats.

(*c*) The number of tillers at the period of maximum tillering is greatly in excess of the number of tillers that produce ears (barley), or panicles (oats).

(*d*) With barley, out of 21.2 tillers per foot present in September on the no nitrogen controls, only 11.7 tillers succeeded in producing ears. On the nitrogen plots, there were 34.7 tillers in September and of these 20.0 tillers produced ears. The ratio

of ear-bearing tillers on the two plots of barley was 11.7 to 20.0, and since the mean yield of barley grain was 109 per cent. higher on the plots treated with sulphate of ammonia as compared with the no nitrogen controls, and as the number of ear-bearing tillers was only 71 per cent. greater it would appear that while the greater part of the barley increase resulting from the application of nitrogen was due to the increase in ear-bearing tillers, portion of the increase in yield was due to increased length of ear.

(*e*) The position with regard to oats is of interest. At the period of maximum tillering 22.6 stalks per foot were found on the no nitrogen plots, as compared with 41.0 stalks per foot on the plots treated with nitrogen. The nitrogenous dressing therefore increased the formation of tillers by 83 per cent.

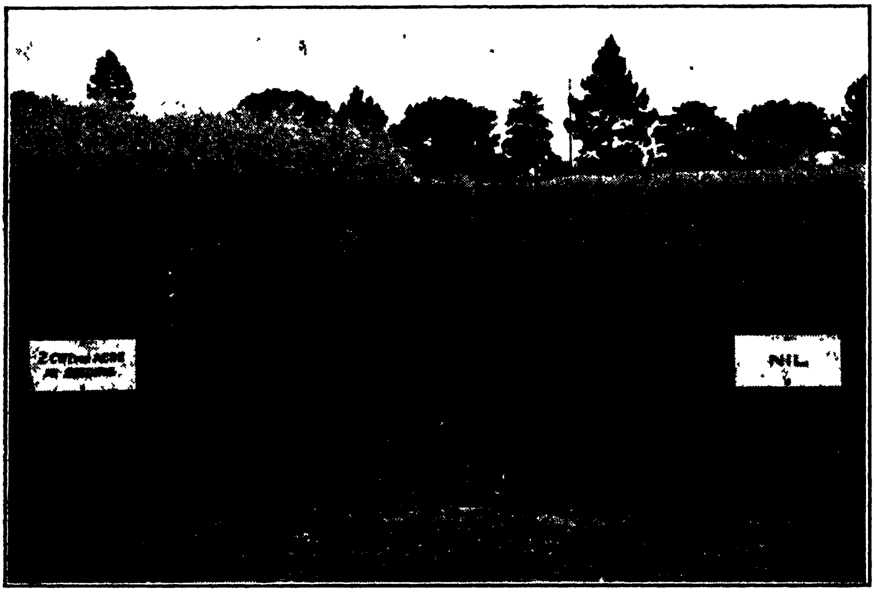


Figure 6.—View of oats (16/11/33) on stubble ploughed land which received (1) 2cwt. sulphate of ammonia at seeding, and (2) no sulphate of ammonia.

A substantial proportion of these tillers failed to produce panicles, but the proportion is much higher on the nitrogen than on the no nitrogen plots. Only 37.4 per cent. of the total tillers produced panicles on the nitrogen treated plots, whereas on the plots receiving no nitrogen 63.7 per cent. of the tillers produced panicles.

The census study shows that at harvest the actual number of oat panicles produced per foot was not increased materially by the nitrogen. This was due to the fact that the advantage gained by increased tillering was lost by a high mortality rate among the tillers, so that at harvest the number of oat panicles per foot on the no nitrogen controls and the nitrogen treated plots was respectively 14.4 and 15.3 for the two seasons. The mean grain yield, however, was 75.0bush. per acre on the plots receiving nitrogen as compared with 40.91 on the no nitrogen controls. Thus, though the grain yield of oats was increased by 83 per cent. by an application of nitrogen, the number of seed bearing panicles per foot was only slightly

The effect of sulphate of ammonia on the general development and size of the oat panicles was very striking in comparison with panicle development on the no-nitrogen plots. This improved size and development of the panicles was mainly responsible for the large increase in grain yield observed during each of the two seasons.

Nitrate nitrogen determinations were made during the two seasons 1933-34 on the soil to a depth of 3ft. on the no nitrogen barley plots. The mean amount of nitrate nitrogen at seed time for season 1933-34 to a depth of 3ft. was 3.6 parts per million. As the crop developed, this amount was gradually reduced and at the stage of maximum tillering amounted to 2.75 parts. As the crop advanced towards maturity, the amount of nitrate nitrogen increased, presumably because the amount formed by nitrification during late spring when temperature and moisture conditions in the soil were favourable, exceeded the nitrogen intake by the crop. At harvest it was found that the mean nitrate nitrogen content of the soil, to a depth of 3ft., amounted to 3.5 parts per million, practically equivalent to the amount present at seeding.

DISCUSSION.

During a period of low prices for primary products, farmers naturally seek to impove the efficiency of their farming methods; no avenue which may lead to greater production at an economic cost can be neglected. The use of the best cultural methods, selection of appropriate varieties, and the application of fertilisers at the most economic rate become essential for the profitable continuance of cereal growing under existing conditions.

In most wheat districts the application of superphosphate equally with the use of a well prepared bare fallow is rightly regarded as a standard procedure for the growth of a good wheat crop. The cultural practice of growing wheat after bare fallow has obscured to some extent the merits of nitrogenous fertilisers for the wheat crop, and incidentally to such crops as are normally sown on stubble, *e.g.*, barley and oats.

While the precise physical, chemical, and biological changes which take place in a soil during the process of bare fallowing are incompletely known, it has been established definitely that a fallow soil contains more nitrate nitrogen at the end of the fallowing period than at the beginning. Moreover, it has been shown that the organisms responsible for nitrification work most actively in late spring and autumn provided the conditions regarding soil moisture are favourable ([9]). The net result of this activity in the soil is that sufficient nitrate nitrogen is produced in the surface layers of a well-worked fallow to meet the needs of prolific wheat crops. On the other hand, the conditions in stubble ploughed soil are very different. Here the available nitrate nitrogen, and indeed the soil moisture have been practically exhausted by the previous season's crop, and the conditions in the stubble soil during the dry summer are unfavourable for the nitrifying organisms in the soil. The nitrate nitrogen content of the stubble soil before seeding is therefore always inferior to that of a well-worked fallow, and indeed these investigations show that the stubble soil rarely contains sufficient nitrates to meet the requirements of a good cereal crop. Hence the application of a nitrogenous fertiliser to a stubble ploughed soil removes one important limiting factor for the growth of the crop. Whilst it is true that the fallow soil usually contains more moisture at seeding than the stubble ploughed soil, yet the difference between the fallow and the stubble ploughed soil in regard to moisture content is not as great as is generally supposed, at least under conditions similar to those that obtain at the Waite Institute.

The evidence obtained at the Waite Institute shows that the nitrate nitrogen accumulated in the fallow soil is a major factor in accounting for the heavy increase in crop yield from fallow as compared with stubble. Moreover, if the shortage of nitrate nitrogen in the stubble be made good by the application of nitrogenous fertilisers, the yields of wheat on stubble, in a district of liberal rainfall, will not fall far short of those obtained on well-worked fallow.

The application of nitrogenous manures to wheat on fallow has not materially increased the yield of wheat on bare fallow over a five-year period at the Waite Institute. On stubble land, however, the mean increase in yield over a five-year period was found to be 5.4bush. per acre for an application of 1cwt. of sulphate of ammonia.

The value of this increase is dependent on the relative prices of wheat and sulphate of ammonia, and reference to the photograph of the solid model will show that the amount of profit is considerable when wheat prices are favourable.

The greater proportion of the wheat in Australia is sown on a bare fallow. Under these conditions the use of nitrogenous fertilisers would not be necessary, since, as has been shown above, the fallow normally contains an abundant supply of nitrate nitrogen, and, moreover, even under the liberal rainfall conditions of the Waite Institute, the application of nitrogen on bare fallow does not give a material increase in crop yield.

Unfortunately for Australia, however, there is still a considerable area of the wheat crop which is not normally sown on bare fallow. It is difficult to obtain precise data on this point, but probably one-third of the area annually planted is sown on stubble ploughed land. It is on this portion of the wheat area, particularly in districts of liberal rainfall, that nitrogenous fertilisers may be used with advantage, especially if prices for wheat improve.

The position regarding barley and oats is very different from that of wheat. Wheat, as the main source of income for tens of thousands of farmers in the cereal cultivation belt, receives, not unnaturally, preferential treatment as compared with oats and barley. Thus in most districts wheat is, or should be, sown only on well-worked fallow, and when the seasonal break in the weather occurs it usually receives the undivided attention of the grower until the last acre of wheat is sown. Oats and barley, on the other hand, are almost invariably and necessarily sown on land more or less hastily prepared from grass or stubble which, as shown above, are normally deficient in nitrate nitrogen at seedtime.

Under these conditions, one would expect a favourable response to nitrogenous fertilisers, and the experiments recorded above show that most striking and profitable increases in yield are obtained from these crops with nitrogenous fertilisers.

The mean increase in yield at the Waite Institute for the two seasons for 1cwt. of sulphate of ammonia are for barley 17.4bush. per acre and for oats 18.7bush. per acre. The increase in oaten hay yield for 1cwt. of sulphate of ammonia was 17.5cwts. and for a 2cwt. dressing, 32.1cwts. These striking increases in the yield of oaten hay and grain are of special significance to growers in the better rainfall areas since oats are largely used for hay and are frequently sown on stubble land after wheat.

Confirmation of these results of the value of nitrogen on stubble soils with oats and barley have been obtained during the past season at a number of centres in Victoria and South Australia ([10]).

SUMMARY.

Investigations on the effect of nitrogenous fertilisers on the growth of wheat, oats, and barley have been conducted at the Waite Institute for seven seasons.

1. Comparisons made over a five-year period to determine the effect of nitrogen on the yield of wheat sown on bare fallow and on stubble ploughed land gave the following results:—

(1) The response of wheat to nitrogenous fertilisers on well worked fallow was not sufficient to be profitable.

(2) On stubble ploughed land sulphate of ammonia in quantities ranging from ½cwt. to 2cwts. per acre gave profitable increases in crop yield, at normal prices for wheat and fertiliser. The mean increase in yield for five years with wheat on stubble was 5.4bush. per acre for an application of 1cwt. sulphate of ammonia.

(3) Census studies on the growing crop showed that with wheat the main effect of sulphate of ammonia was to cause a vigorous burst of tillering resulting in a greater number of ear bearing tillers at harvest and that this was the major factor accounting for the increase in yield.

(4) The moisture content of the fallow soil to a depth of 3ft. was found to be slightly higher than that of stubble ploughed soil at seeding. The nitrate nitrogen content of the fallow soil was found to be considerably higher than that of the stubble ploughed soil at seed time. These two factors are not of equal importance in a region of liberal winter rainfall as the lack of nitrate nitrogen in a stubble soil is relatively more serious than lack of moisture.

(5) Equivalent quantities of nitrogen (23.4lbs. N. per acre) applied in various forms showed that over a period of five years nitrate of soda gave the largest increases. No significant differences occurred between the increases given by sulphate of ammonia, nitro chalk, and urea.

2. The results obtained with barley and oats show that striking increases in yield are obtained with sulphate of ammonia on stubble land when the supply of soluble phosphate is adequate.

(1) An application of 1cwt. sulphate of ammonia per acre increased the mean yield of barley grain by 17.4bush. per acre for seasons 1933-34. An application of 2cwts. per acre increased the grain yield by 29.1bush. per acre.

(2) With oats the addition of 1cwt. per acre of sulphate of ammonia increased the grain yield by 18.7bush. per acre and the yield of total produce (hay) by 17.5cwts. per acre for the seasons 1933-34. An application of 2cwts. sulphate of ammonia increased the hay yield by 32.1cwts. per acre and the grain yield by 34.1bush. per acre.

(3) The stubble soil was poorly supplied with nitrate nitrogen at seeding as the previous crop of wheat had reduced the available moisture and nitrate supply to a low level at harvest, and nitrification did not proceed actively during the summer and autumn periods owing to the dryness of the soil.

(4) Census studies showed that with barley the major part of the increased yield following an application of sulphate of ammonia was due to an increase in the number of ear bearing tillers. With oats the increase in grain yield was due mainly to the improved panicle development following an application of nitrogen.

(5) The striking increases in yield with these crops are of special significance to growers in the better rainfall areas of Australia since both barley and oats are frequently sown after wheat.

REFERENCES.

(1) A. E. V. Richardson: Dept. Agric. Victoria, Bull. No. 55, pp. 48-52.
(2) W. R. Birks and T. A. Cole: J. Agric. South Australia, 1929, 33, 960-66.
(3) R. C. Scott and E. A. Bristowe: J. Agric. South Australia, 1928, 32, 920-30.
(4) R. A. Fisher: Statistical Methods for Research Workers, Oliver and Boyd. R. A. Fisher and J. Wishart: Imp. Bur. of Soil Science, Tech. Comm., No. 10.
(5) (a) A. E. V. Richardson and H. C. Gurney: Empire Journ. Exper. Agric., 1, 193-205.
(b) A. E. V. Richardson and H. C. Gurney: Ibid., pp. 325-32.
(6) L. J. Briggs and H. L. Shantz: Bot. Gaz., 1911, 51, 210-19.
(7) W. J. Spillman and Emil Lang: Law of Diminishing Return, Harrap & Co., London.
(8) E. A. Mitscherlich: Landw. Jahrb., 1909, 38, 537-52.
(9) J. A. Prescott and G. R. Piper: 1930 Jour. Agric. Sci., 20; 517.
(10) R. C. Scott: J. Agric. South Australia, 1935, xxxviii., p. 988.

THE STATE EXPERIMENT ORCHARD, COROMANDEL VALLEY, NEAR BLACKWOOD, SOUTH AUSTRALIA.

[Report 1908-1934 by GEO. QUINN, Chief Horticultural Instructor, Department of Agriculture.]

ORIGIN AND OBJECTS OF THE ORCHARD.

During the first decade of the present century, the various sections of the Agricultural Industries of the State had definitely begun to emerge from the veritable "slough of despond" which had enveloped them for upwards of a generation.

It may be claimed that this substantial revival was directly attributable to the more general adoption of improved cultural practices, and although perhaps more applicable to the wheat farmers, it also applied—though with less spectacular results—to other minor land industries such as fruit and vine growing.

It was just then becoming recognised—though somewhat tardily perhaps—that the utilisation of these improved methods had largely evolved from the teachings and demonstrations conducted at the Agricultural College supported by the propaganda instituted by the Agricultural Bureau working in conjunction with a few field Instructors employed by the Government to specialise on stimulating certain forms of rural production. Of these Officers—who subsequently formed the nucleus of the technical staff of the Department of Agriculture—the present Director of Agriculture (Professor Perkins) and the writer of these notes form the only remaining Official links.

Having realised by experience gained during this transitional period how futile it was to endeavour to conduct with reasonable accuracy in privately owned plantations, tests and demonstrations on fruit trees or grape vines over a sufficiently long period of years to secure reliable results, the writer resolved to try to induce the Government of the day to enter upon the establishment of a State-owned orchard in which this work might be carried on continuously under trained supervision. Having already instituted a policy of conducting State experiment farms in some of the newer wheat-growing areas, the Government took a sympathetic view of the proposal and agreed to the suggestion.

In 1906, an area of some 13 acres of deep alluvial land situated within the city boundaries adjoining the Botanic Garden on one side and abutting on to Hackney Road on the other was granted for an Experiment and Demonstration Orchard. This land had formerly been used for many years by the Adelaide Hospital for the Insane for orchard, vineyard, and general garden purposes, when that institution was located on the eastern end of North Terrace, Adelaide, but since its removal to other quarters, the land had lain unused, the trees and vines unpruned, and over-grown with weeds—the resort of pilferers and pestiferous bird life. The allocation of this particular area of land, as the following facts indicate, arose from certain circumstances which afterwards had a direct bearing on the establishment and subsequent scheme of planting followed in the Blackwood State Orchard in Coromandel Valley. Briefly stated, these were as follows:—

In the mid nineties of last century, the late Hon. Thomas Playford—whose private business was that of a fruitgrower and market gardener at Norton's Summit—went to London as Agent-General for this State. He naturally became interested in matters pertaining to fruit growing and

trading as carried on in Great Britain and soon realised that the nomenclature of many of the varieties of fruits he had known in South Australia was much confused and he at once took practical steps to try to remedy the position.

After consultation with Pomologists and other authorities he procured from leading British fruit tree nurserymen, type trees of a good many of the sorts he now knew to be growing under wrong names in South Australian orchards. In due season, these trees were despatched to the Government in Adelaide.

When they arrived, there being no Agricultural or Horticultural Department in existence to receive them, the trees were handed by the Treasury Department to the Director of the Adelaide Botanic Garden for planting at his discretion. The arrival of further lots of fruit trees from the same sources caused the Board of Governors of the Botanic Garden to take some thought respecting what should be done with them. On appeal to the Government of the day, they were offered a portion of an aboriginal reserve of densely timbered land situated in the Onkaparinga River Valley near the village of Mylor for the purpose of establishing a Type Orchard. This land was in an isolated position, difficult of access, and its only recommendations lay in the facts that it cost nothing and was in the Mylor district, largely occupied by a large number of recently settled lessees of homestead leases who were endeavouring to make a living by growing fruits and vegetables under extremely difficult conditions.

A portion of this land was cleared of timber and rocks at great expense and a plantation of varieties of fruit trees begun. The then Director of the Adelaide Botanic Garden (Dr. W. M. Holtze) entered upon the project most enthusiastically and in the course of a few years collected from European and Australian nurseries an immense collection of varieties of fruit trees of all kinds grown in temperate and sub-tropical climates, and planted them in the Mylor Type Orchard. It was soon found, however, that many sorts of fruit trees which hailed from the warmer climates would not tolerate the wet, frosty winters experienced in that part of the Onkaparinga Valley. As most of the soil in this orchard was of exceptionally poor quality and lacked adequate under-drainage, such features only added further difficulties to the task of maintaining them in a thriving condition.

It was at this juncture that the writer's desire to establish a State controlled demonstration and experiment Orchard first became known to the Botanic Garden Board. That Board generously offered to forego a prior claim they had established over the land adjoining their domain in Adelaide—to which previous reference has been made—and agreed to the suggestion that it be granted to the Horticultural Section of the then newly formed Agricultural Department, and further, that the kinds of fruit trees found to be unsuited to the Mylor conditions of soil and climate, be transferred to the Hackney Road site and thus preserved from extinction. This suggestion was adopted, and early in 1907, a nursery was formed under the writer's supervision on the southern end of the land adjacent to the Waterfall Gully creek, and a start made to propagate the varieties of peach, apricot, plum, fig, citrus, grape vine, almond, olive, and other fruits found most intolerant of the Mylor conditions. Whilst this work was in progress, the remainder of the 13 acres of land was cleared of old fruit trees, grape vines, and ornamental forms of trees and shrubs planted by the former occupants. The land was ploughed and subsoiled and reticulated with water pipes preparatory to being planted in orchard form. This preparatory work was scarcely completed when the

Price Government intimated that the major portion of the area would be very desirable as a site for the erection of a central car depot and block of administrative offices for the then recently formed Municipal Tramways Trust.

It had been foreseen from the outset that the location of this land from the point of view of conducting, without molestation, experiments in fruit culture had many drawbacks.

After further negotiation, some nine acres were surrendered for the above-named Tramway purposes, and the writer, authorised by the Government to secure offers for land "up to 100 acres" in area which might be deemed more suitably placed for the purpose of establishing an orchard in which to conduct experiments and demonstrations in fruit culture, and to test varieties of fruits not common to the State. The remaining four acres of land at Hackney Road was, owing to its proximity to the city, and good soil, retained for nursery and demonstration purposes, and the State collections of citrus trees and grape vines grown therein. At the present time, this small plantation is officially known as the Adelaide Demonstration Orchard.

With the generous assistance of two local orchard owners—the late Hon. G. R. Laffer and Mr. W. L. Summers—the writer was enabled early in 1908 to secure the purchase by the Government from Mr. J. Dall for £800 of 52½ acres of land, being part section 867 in the hundred of Adelaide, situated in Coromandel Valley, within one mile of the township of Blackwood. On this land, the plantations now known as the Blackwood Experiment Orchard have since been established. During March, 1908, the Government entered into possession of the land, and with the opening of the rainy season in May preparatory operations were begun under the supervision of the first orchardist, Mr. C. G. Savage, who now occupies the important position of Director of Fruit Culture in the Department of Agriculture of New South Wales.

Coromandel Valley is situated in the first fold of the Mount Lofty Ranges on the western side where the frontal ridges overlook the plains of Adelaide, and the waters of Gulf St. Vincent. Its northern end, where the State Orchard is located, is about 9½ miles from Adelaide by the main bitumen road to Clarendon and other southern districts in the Ranges. This road traverses almost the entire length of this picturesque valley, and through which it follows the winding course of a small stream known as the Sturt River, which drains the surrounding countryside into Gulf St. Vincent.

The prevailing climatic conditions are intermediate between those of the hotter and drier plains of Adelaide, and the wetter and colder regions located higher up in the Mount Lofty Ranges.

The Experiment Orchard, which is located on the eastern or rising side of the Valley, has an elevation ranging between 700ft. and 800ft. above sea level. The meteorological data collected therein indicate that the average annual rainfall recorded from 1909 to 1933—a period of 25 years—has been 29.66in. The average monthly distribution of this throughout a calendar year may be seen in the following table:—

January	**0.76in.**	**May**	**4.10in.**	**November**	**1.35in.**
February	**1.11in.**	**June**	**4.70in.**	**December**	**1.37in.**
March	**1.18in.**	**July**	**4.04in.**		
April	**1.68in.**	**August**	**3.68in.**	**Total**	**2.72in.**
		September	**3.57in.**		
Total	**4.73in.**	**October**	**2.12in.**		
		Total	**22.21in.**		

It will be noted that approximately 75 per cent. of the rain falls during what may be termed the winter and spring season, viz., May to October, and only 25 per cent. during the hotter months—November to April—of summer and autumn, when the mean monthly temperatures range from 60° F. upwards in the shade. During the above period, the rainfall exceeded 40in. (highest 42.82 in 1923) during two years only, and the lowest, and only registration below 21.15in. (the Adelaide Plains average for 95 years) was 15.06in. in 1914—the noted year of drought throughout Southern Australia.

The average monthly occurrences of temperatures of 32° F. and under. recorded on the grass during the colder and wetter seasons—May to October—throughout the 10-year period 1924-1933 inclusive, were as under:—

May	3.5 days	August	6.4 days
June	6.4 days	September	2.6 days
July	6.9 days	October	0.7 days

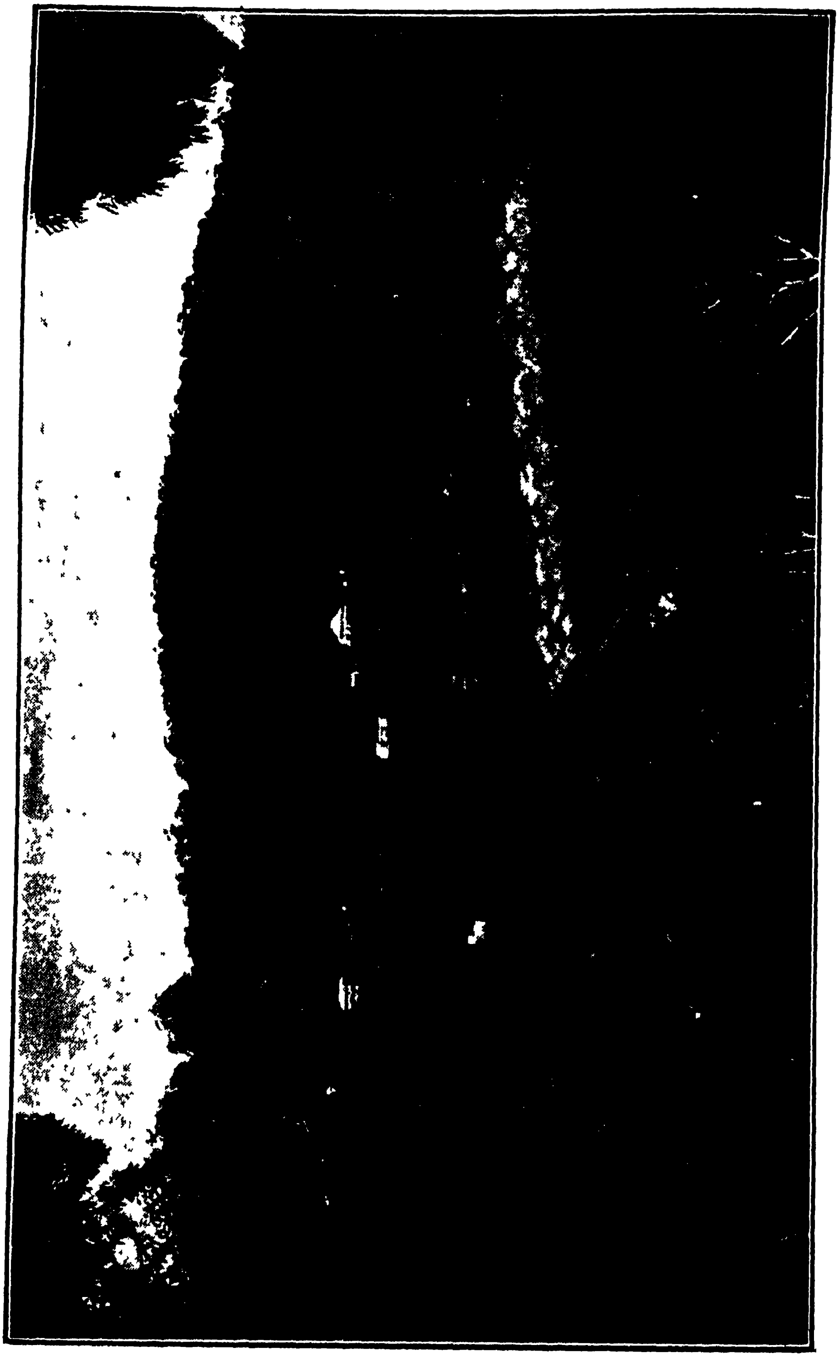
The average monthly registrations of summer heat of 100° F. and over as recorded in a standard shade screen 4ft. 6in. above ground level through the hotter months—November to March—during a 10-year period from December, 1924, to March, 1934, were as follows:—

November	0.7 days	February	3.6 days
December	3.2 days	March	2.2 days
January	4.9 days		

Taking at this juncture a 3-year period only (1931-32-33) from the accumulated daily data of 25 years, the respective monthly averages of minimum and maximum air shade readings and soil temperatures indicate monthly means approximating to the following:—

	Under shade screen 4ft. 6in. above ground. ° F.	Under soil 18in. below surface. ° F.
January	71.5	75.0
February	69.5	72.0
March	67.0	68.0
April	60.0	59.5
May	57.5	55.0
June	51.5	49.0
July	49.5	46.5
August	51.0	48.5
September	55.0	52.5
October	58.8	56.0
November	63.5	65.0
December	68.0	72.5

The eastern side of Coromandel Valley consists of a series of rolling ridges displaying a general fall to the west, thus allowing the small water-courses which have formed between them to empty the surplus rains of winter into the Sturt Creek. In the panoramic view of the central portion of the State Orchard presented herein, it will be seen that the land of which the orchard is composed is made up of two main slopes, one from the northern, and the other from the southern sides of two of these more or less parallel ridges. The winding channel of the small water-course which drains them, as well as the higher ridge further eastward may be



Panoramic view of the central portion of Blackwood Experiment Orchard, looking eastward.

readily traced at the base of the left-hand slope which faces south. The steepness of this slope is well displayed by the belt of dark pine trees which have been planted up over the ridge to afford shelter from the winds to the trees planted on that portion of the eastern half of the slope which is hidden from view. On the top of this slope and eastward of the pine belt, a small plateau of several acres is located in the north-eastern corner of the orchard block. This small creek traverses the full length of the orchard, and, as will be noted on the accompanying plan, it junctions almost at right angles with another larger creek coming from the northwards. This creek drains the National Park near Belair and cuts off several acres of land yet unplanted along the western boundary of the orchard property. The creek which bisects the orchard lengthways is actually an artificially made ditch dug by the orchard staff around the contour of the base of the slope. The natural watercourse—as shown in dotted marginal lines in the plan—followed a very tortuous channel through which a dark plot of citrus trees is now seen in the picture, and along the base of the slope on the right-hand side. By utilising its deeply scoured, irregular bed as a repository for many hundreds of tons of stone outcrops which were removed from the hillsides when preparing the land, and eventually covering these deeply with the good soil taken from the present ditch, several acres of valuable land were reclaimed, and the general tillage of the lower parts of the slopes facilitated for all time.

The slope on the right, which faces northwards, is not nearly so steep or undulating on its surface as is the opposing one which turns away from the sun; neither does it present such great variations in soil textures.

When the land was purchased by the Government, the slope facing northwards on which a large white patch of trees is shown in the picture, was clear of timber and had been cultivated for some years by the former owner for hay growing purposes. The opposing slope which is only partly seen on the left-hand side of the panoramic view, was covered with a strong growth of South Australian Red Gum trees (*Eucalyptus rostrata*), approximately 20 years or more old. Scattered between the half dozen trees which were standing on each acre of land, were hundreds of dead stumps of similar gum trees which had been killed some years previously to admit light and promote the growth of herbage for stock grazing purposes, to which use it had been applied by the previous owner.

The close, clay-like structure of the soil body which covers the surface of the orchard area, clearly indicates that it has been mainly derived from the decomposition of the original slates—mud-stone-rocks—which now underlie it at varying depths and occasionally may be seen on the unbroken area in the form of shelving surface outcrops. Blended with this, fragments of quartz of various sizes are found, evidently having been carried by erosion from the higher ridges of the range and deposited, together with ironstone gravel and silicious materials, in a finer state of subdivision over the surface of the land. This mixture of mineral components is blended with a very small proportion of substances of organic origin, excepting in small pockets on some of the northern slopes or in the narrow flats along the sides of the watercourses. In these latter positions the surface soil is deeper, more sandy, and of a highly humified character. Numerous soil profiles examined along the slopes and on the flats indicate that clay preponderates in the surface loams. These surface soils vary in depth from 5in. to 13in. on the slopes with an average depth of 8¼in. in 25 tests. On the narrow flats the surface soil is deeper, and nine tests range from 7in. to 24in. with an average of 15in. in depth.

In the same series of examinations, the underlying subsoils of red or yellow—deep chrome yellow-clays ranged in depths from 9in. to 41in. or an average of 26in. on the slopes. In the flats, the range was less, viz., from 16in. to 32½in., and averaging 25in. These very plastic clays were frequently mixed with nodular or broken gravel-like slate and quartz stones; occasionally larger, loose, unstratified slate stones impeded boring, and had to be removed by crowbar. Calcareous nodules were found in only two of the tests. In many of these holes, roots of the fruit trees were found deep in the clay and stony mixtures. These soundings were carried down until a solid bottom of stone or extremely hard soil mixture was met. On the sloping land the average depths to solid stone were 32in. ranging from 44in. to 21½in. below the surface, found in 11 testing positions. On the flats two positions in nine tests showed solid stone at 47in. and 40in. deep respectively. Solid earth was found in the remaining seven at an average depth of 44in. No solid stone bottom was reached in 14 positions on the slopes when tested to depths varying from 51in. to 26in. to a non-rocky solid formation deemed capable of resisting root penetration. The average depth to this stratum was 39in.. These lower soundings certainly indicate the shelving towards the surface of the slate rock formation at irregular intervals over the area. It may be accepted that in this surface loam, the clay factors predominate, thus rendering the land somewhat heavy to till and prone to set rapidly into a hard crusted condition after a few hours of spring or summer heat or drying wind. In actual practice, spring ploughing may, in certain seasons, require the immediate accompaniment of the harrows or scarifier to prevent the encrusting of the upturned sods to such a condition of resistance that without soaking rain falls at once, only the use of a very heavy roller will enable the orchardist to bring the surface to a desirable fine state of tilth. This type of surface soil, unless well blended with organic matter and roots of herbage, particularly, has a great tendency to suffer from erosion, more especially when violent thunder showers fall upon the land when it is covered with the finely pulverised layer deemed so desirable as a summer condition in this climate. This tendency doubtlessly accounts for the shallow layer of loam previously referred to as overlying the sloping hillsides. The loss, in the aggregate, of hundreds of tons of this surface soil from the steeper slopes of the Blackwood Orchard site has confirmed these statements throughout the quarter of a century under review.

It may be claimed that a very large proportion of the land devoted to fruit culture in the coastal districts of this State closely approximates to that described above. This decomposed "mudstone" basis forms the principal bulk of the soil body, the variations consisting chiefly of differing proportions of silicious sand and quartz, calcareous (lime) and organic compounds blended therewith in the different districts, and in different orchards, and even extending to various areas of the same orchard or vineyard in a district. During recent years, an effort has been made at Blackwood to stop these losses of the more valuable surface loams by endeavouring to grow winter cover crops consisting of peas, beans. barley, mustard, &c., between the rows of fruit trees, and plough them into the soil during early spring. The objective is a long distance one, but it is the way of Nature's laws, and no shorter cuts are possible without enormous expenditure in returning from extraneous sources the lost fertility and texture of the land.

No extensive efforts to evaluate the potential elements of fertility in these soils as possible of revealment by chemical analysis have been made.

In 1912, the Government Department of Chemistry analysed eight samples of soils and subsoils drawn from certain test plots located along the southern slope. The results of these indicate that the average percentages of the principal elements of fertility deemed to be present in the top 9in. may equal:—

Nitrogen.	Phosphoric Acid.	Potash.	Lime.	Fine Earth.
				(Passing 1 M.M.
(N)	(P_2O_5)	(K_2O)	(CaO)	Mesh Sieve)
.019%	.043%	.165%	.219%	91%

By way of comparison, similar data from analyses made of samples of surface soils drawn from a like depth in 10 fair average orchards and vineyards located in seven different districts in this State, indicate an average content of these plant foods to approximate to:—

N.	P_2O_5	K_2O	CaO
.082%	.046%	.324%	.517%

Further samples tested from two orchards located in the richest types of lands in the Mount Lofty Ranges show:—

N.	P_2O_5	K_2O	CaO
.205%	.151%	.471%	.454%

In the older countries of the world, it has been claimed that a soil to be classed as reasonably fertile, should contain at least:—

N.	P_2O_5	K_2O	CaO
.1%	.1%	.2%	2 to 3%

If judged from the two last quoted standards, the surface soils in the southern half of the Blackwood Experiment Orchard would appear to be weak in all of these elements so desirable for the healthy growth of plants. With the exception of Phosphoric Acid—which is also low—they fail to reach the standard of fertility displayed in the soils of the 10 fair average orchards and vineyards scattered throughout seven different parts of the State.

Analyses made of the subsoils to a further 9in. in depth revealed in the Blackwood samples that apart from the nitrogen content being appreciably lower and the Potash a little more abundant—which might be expected in these clays—there was little difference in the quantitative distribution of these fertilising elements to a depth of 18in. below the surface of the land.

During the winter of 1908, the right-hand slope—which faces the sun—previously used for hay growing, was ploughed and sub-soiled. For the ploughing, a heavy single-furrowed steel Cockshutt plough, cutting a 12in. wide furrow as deeply as two strong horses could manage, was used. In this furrow, an American type of subsoil plough with a goose neck shaped body fitted with a chisel pointed share on the sole plate, was drawn by four horses, breaking up its bottom as deeply as possible. Although this slope had been ploughed many times by the former owners, the land had not been disturbed for a greater depth than 3in. or 4in. It was soon found that the huge root systems of the original red gum trees still remained in a perfectly sound condition—in so far as the main roots were concerned—just below the above depth. The removal of these by means

of explosives and hand labour entailed a good deal of delay and expense. The presence of smaller roots and isolated slate stones which had been detached from the underlying reefs increased the difficulty of securing anything like a regular depth of disturbance of the sublayers. Finally, this was fairly well accomplished to depths varying from 9in. to 16in. over the block. The land was then scarified and brought to a workably smooth surface prior to pegging it out for planting.

This type of subsoiling plough was deemed to be too weak and the preparatory work applied subsequently to the remainder of the orchard area was done by the use of a very heavy disc plough capable of cutting a furrow upwards of a foot deep. This was drawn by eight bullocks which worked on the steep, slippery slopes without injury, although they often fell to the ground. This plough was accompanied by three workmen using picks and grubbing tools to remove loose stones or roots which, in places,

Preparing steep hillside land at Blackwood Experiment Orchard, South Australia.

obstructed the disc. The soil slice was thrown over in the direction of the lesser slope of the land, thus clearing the furrow and assisting the workmen in locating and removing obstructions. On the steeper portions of the land, the ploughing was all done down the slope, and the team returned with the plough riding free.

This procedure was slow, but it resulted in a splendidly prepared planting bed for the reception of the trees.

As indicated in the plan printed herein, the area was mapped out into blocks—afterwards distinguished by letters of the alphabet. This was effected by dividing up the slope with longitudinal roadways running east and west, and bisecting these by cross roadways which intersect them at right angles. Block A, as shown in the plan, is located at the eastern boundary end between the central longitudinal roadway, and the southern boundary of the Orchard. The tree positions in each row are numbered from left to right—as printing is ordinarily done on the pages of a book. The rows which run north to south up the slope are numbered consecutively in each block. In the blocks occupied by the collections of

varieties of different fruits, each individual label bears a complete history of the location, origin, and age of the tree to which it is attached. This label gives the specific orchard number allotted to that particular variety in the permanent record books in the office. This number is printed on the top left-hand corner. Next comes the alphabetical letter by which the block is known. In the same alignment, the number of the row in the block is stated, followed by a figure or figures indicating the tree's position in that row.

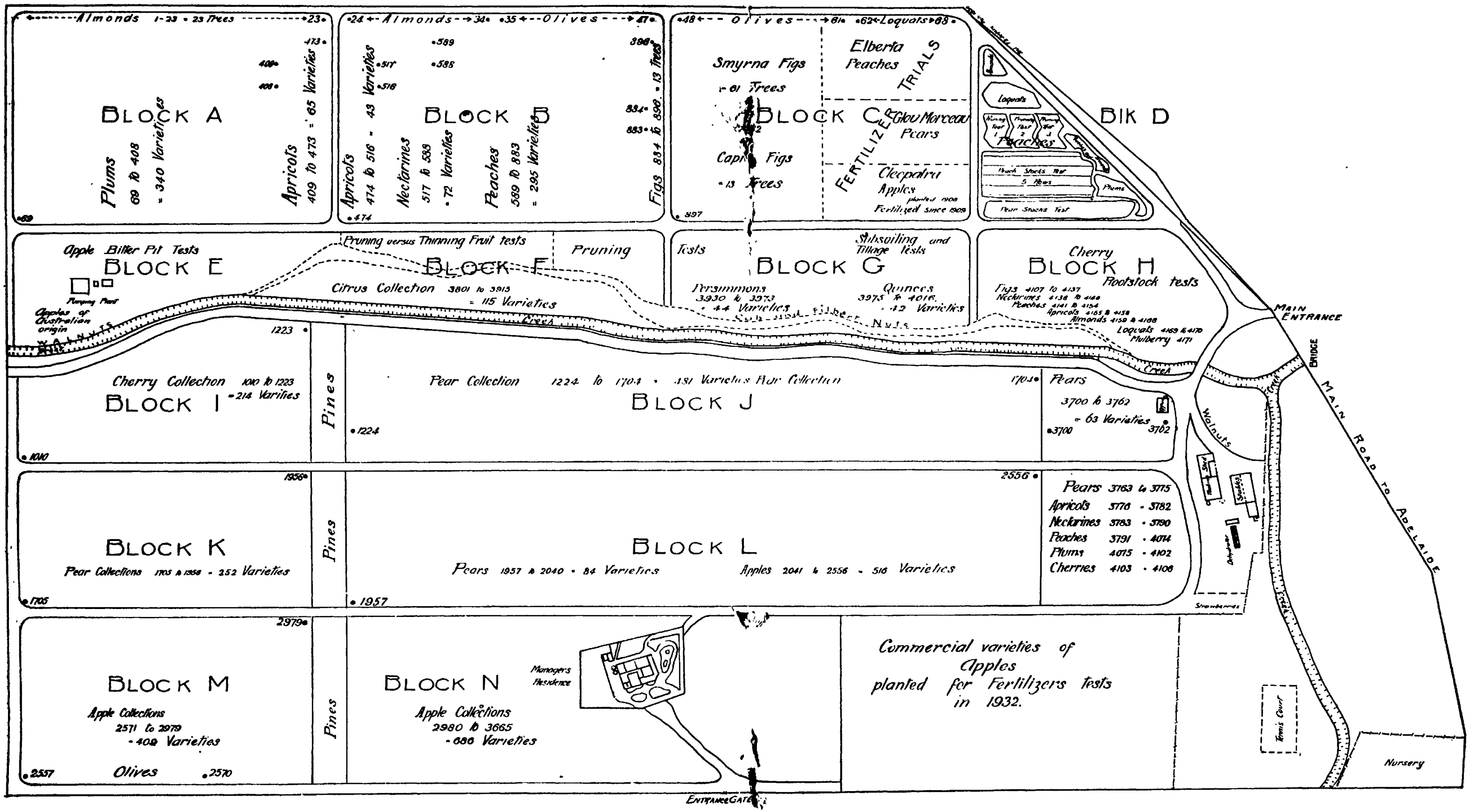
Below this line, the name of the kind of fruit is stated, and below that, the name of the variety. On the fourth line on the left-hand side, the name of the nursery of origin and on the right-hand side, the name of the State or country whence it came. On the bottom right-hand corner, the year when the tree was planted is given. A typical specimen label made of 24-gauge iron, and which measures 6in. x 4in. is shown herein. It has a dark-blue vitreous kiln enamelled surface on which the letters and figures are enamelled in white. The label is perforated with holes and may be hung on the tree or fastened to a stake, and without violence

532 B 13 1
NECTARINE
COOZA
WICKS S. AUST.
/25

be applied to it, it is practically everlasting and decipherable throughout its lifetime. These labels are made locally and cost the Government 1s. 4d. each complete in Adelaide.

So simple and complete is this system, that there would be no difficulty on the part of anyone in replacing on its own respective tree, any one of the 4,000 odd labels, providing one knew the identity of the first block (A) in the Orchard.

The system of spacing the trees adopted in the Blackwood Orchard is known as the septuple, hexagonal, or equilateral triangular system. In this system, lines drawn to connect any three adjacent trees in two adjacent rows will form an equilateral triangle. As the perpendicular height of this triangle is only .866 of the length of any of its sides, it follows that the positions for the trees in parallel rows are farther apart than the distance between the rows themselves. The planting distance between the trees set out on the southern slope of the Blackwood Orchard is 20ft., and consequently, the distance between the parallel rows is 17.32—not quite 17ft. 4in.—wide. This distance and system was chosen in preference to the more popular 20ft. x 20ft. square system of spacing



COROMANDEL VALLEY GOVERNMENT ORCHARD

adopted in commercial orchards, because in planting collections of varieties it was desired to place a greater number of type trees over each acre of land. It must be realised, however, that compared with the 20ft. x 20ft. method, each tree, instead of being allowed an area of 400 square feet in which to spread its roots and tops, it has approximately only 346.4 square feet available.

During the winter of 1908, the blocks marked A, B, and C on the right-hand or southern slope were planted with the collections of varieties of plums, apricots, nectarines, peaches, figs, almonds, olives, and loquats, which had been propagated at the Hackney Road (Adelaide) nursery from scions mostly collected from the Mylor Type Orchard. When these collections of varieties were set out, the names of those of each kind of fruit were placed in alphabetical order. Their respective orders of blossoming or ripening of the fruit, or of the specific origin were not considered. For instance, in the plum collection, the so-called Japanese (*P. triflora* or its hybrids), and those of American origin were included in the general alphabetical lists of the more numerous purely European varieties (*Prunus domestica*).

Whilst affording a ready means of finding the location of any variety in the block, it was found that the work of recording blossoming or ripening periods or any other characteristics peculiar to the varying types or strains, was vastly increased by the method adopted.

In 1908, a plot of land in Block C was also selected for the establishment of a permanent Fertiliser Trial. It was planted with equal numbers of trees of the Cleopatra Apple, Glou Morceau Pear, and Elberta Peach, as representing at that time, the leading commercial varieties of those respective kinds of fruits. Barrier rows of trees of other varieties of the above fruits were planted alternately with the kinds and varieties quoted above. No manures or fertilisers were applied until the following year to the land occupied by these young trees.

THE OBJECTS OF THE ORCHARD.

At an earlier stage in this report it has been stated that the Government of the day had authorised the purchase of land for the establishment of an orchard in which to conduct experiments and demonstrations in various phases of fruit culture, and to grow under correct names and test the qualities of new varieties of fruits not common to the State. In this latter regard, it was at first desired that the work still being done by the Botanic Garden Board at the Mylor Type Orchard should not be duplicated at Blackwood. Subsequent events, however, showed that the then Director of the Botanic Gardens (Dr. Holtze) and his Board rather favoured the transfer of the whole of the collection of fruits grown at Mylor to the then newly established Departmental Orchard at Blackwood. This was partly due to financial reasons, and partly that they acknowledged that Fruit Culture matters generally, had now developed into the concern of a separate Government Department. It was subsequently indicated by Dr. Holtze that as an alternative the Board was not averse to the Mylor Fruit Plantations being taken over by the Horticultural Section of the Agricultural Department.

An exhaustive examination of the Mylor plantations and site, together with the records kept of the collections, was made by the writer, who, owing largely to the inferior nature of the soil and severity of the winter climate, added to the difficulty of access to the property, reported in favour of transferring the remaining collections of varieties of the kinds of fruits still retained there, to the Blackwood site. This proposal was accepted, and Dr. Holtze subsequently rendered all assistance necessary to enable

ERRATA.—The total 4,637 under the table of varieties on page 985 should read **4,237**, and 4,500 should read **4,100**.

the orchardist in charge at Blackwood (Mr. Savage) to procure from time to time scions of all of the kinds and varieties we had not already obtained from Mylor.

A nursery was established on the Blackwood property, and every kind of fruit was eventually propagated by Mr. Savage personally, on rootstocks procured from leading nurserymen in Victoria and South Australia, until he was transferred to the State Irrigated Orchard at Berri in 1917. As a similar procedure had been previously followed at the Adelaide (Hackney Road) nursery, we are in the position of knowing the specific origin of any rootstock on which any tree planted in the Orchard is worked —whether it belongs to the collections of varieties or is set out in any of the various trials. From time to time, additional varieties were obtained from various overseas Countries or States of the Commonwealth, and scions from these have been worked on rootstocks of local origin prior to to being planted in the Orchard. When the latest census was taken in 1927, the numbers of named varieties in the collections of the various kinds of fruits were as under:—

Almonds	46	Nectarines	80
Apples	1,624	Olives	34
Apricots	115	Peaches	362
Citrus	112	Pears	893
Cherries	218	Persimmons	43
Figs	137	Plums	379
Filbert and Cob Nuts	30	Quinces	42
Loquats	17	Walnuts	12
Grape Vines	93		

The latter are planted in the Adelaide Orchard, making a total of 4,637 varieties. Allowing for synonyms, there are now approximately 4,500 distinct varieties in the Orchard.

Since the above date, a few varieties, chiefly of peaches and cherries, have died, but their numbers have been more than covered by later acquisitions of new varieties of other kinds of fruits.

As far as the writer is aware, such a huge collection of varieties of so many kinds of tree fruits is not to be found growing in one plantation in any other country in the world. The collections occupy approximately 37 acres of land in Blocks A, B, parts of C, E, F, G, H, on the southern slope, and in I, J, K, L, M, N, on the northern slope as indicated in the plan herewith. Descriptive records have been made from the fruits of practically all of the varieties, and data relative to the flowering and fruit ripening periods of each one placed on permanent record. These latter data mostly extend over periods of 10 years, and upwards. The qualities of the fruits as detected at Blackwood have been duly noted, as has the comparative resistances also of the trees of most kinds to the attacks of certain common pests and diseases.

A great many tests have been made in respect to the cold storing qualities of large numbers of varieties of apples and pears growing in these collections, as well as into the drying and canning qualities of many sorts of plums, prunes, apricots, and peaches. This is a phase of the Orchard's activities in which much yet remains to be done, more particularly in relation to the many varieties of pears and apples which show much promise.

EXPERIMENTAL TESTS AND DEMONSTRATIONS.

Based on the cultural practices in vogue, and a knowledge of the problems usually discussed by fruitgrowers in this State at the time the Blackwood Orchard was established, the writer compiled the following plan of permanent experimental and demonstration work to be undertaken in respect thereto.

Rootstocks.

Their comparative *compatibilities* and influences in relation to *fruit cropping* and *tree development* in respect to:—

Cherry trees—embodying 5 varieties; 3 trees of each worked on 4 rootstocks and/or stem combinations.

Pear trees—4 varieties; 3 trees of each on 2 rootstocks.

Peach trees—4 varieties; 2 trees of each on 6 rootstocks.

Rootstocks and/or Intervening Stem Pieces.—Their influence, if any, *on the prevalence of "Bitter Pit" in the fruits,* comprising 4 susceptible varieties of apples, each worked on 3 different rootstocks, and 5 different intervening stem pieces.

Pruning Trials—Influence on Tree Development and Fruit Production.

A. *Peach Trees.*—4 varieties, 2 trees of each.
  (1) Pruned in winter only.
  (2) Pruned in winter and summer.
  (3) Pruned in summer only.

B. *Intermittent* (*Biennial*) V. *Annual Pruning* (on spur fruiting kinds of trees).—

Cherry trees	4 varieties, 1 tree of each
Plum trees	4 varieties, 1 tree of each
Apple trees	4 varieties, 1 tree of each
Pear trees	4 varieties, 1 tree of each

C. *Pruning and Thinning Fruit* V. *Pruning Only.*—Apple trees—4 varieties, 2 trees of each under each treatment.

D. *No Pruning—Fruit Thinned* V. *No Pruning—Fruit Not Thinned.*—Apple trees—4 varieties, 2 trees of each under each treatment.

Tillage—Preparatory and Subsequent to Planting—Influence on Tree Development and Fruit Production.

(*a*) *Subsoiling* V.	(*b*) *No Subsoiling.*
Apple trees, 2 varieties, 1 tree of each	Apple trees, 2 varieties, 1 tree of each
Pear trees, 2 varieties, 1 tree of each	Pear trees, 2 varieties, 1 tree of each
Plum trees, 2 varieties, 1 tree of each	Plum trees, 2 varieties, 1 tree of each
Peach trees, 2 varieties, 1 tree of each	Peach trees, 2 varieties, 1 tree of each
Apricot trees, 2 varieties, 1 tree of each	Apricot trees, 2 varieties, 1 tree of each

Both (*a*) and (*b*) plots were ploughed every year in autumn and again in spring, and scarified several times during the summer.

(*c*) *Subsoiling.*—

Apple trees	2 varieties, 1 tree each
Pear trees	2 varieties, 1 tree each
Plum trees	2 varieties, 1 tree each
Peach trees	2 varieties, 1 tree each
Apricot trees	2 varieties, 1 tree each

This plot was ploughed every year in spring only, and scarified several times during the summer similarly to (*a*) and (*b*) plots.

Fertilisers—Influence in relation to Shoot Growth, Stem Enlargement, Fruit Production and Quality, and presence of "Bitter Pit" in the fruit of apples.

Trials with 10 fertilisers and/or combinations in comparison with unmanured check trees:—

Apple trees (Cleopatra), 3 trees in each trial.
Pear trees (Glou Morceau), 3 trees in each trial.
Peach trees (Elberta), 3 trees in each trial.

In the light of the developments which have taken place in the technique applied to planning horticultural experiments and research work in respect to fruit trees, particularly in Great Britain during the past 10 to 15 years, the above programme must appear not only very ambitious, but in many respects unsound. This would appear to be more particularly so, in so far as the reliability is concerned, of the results obtainable from any attempt at making a quantitative analysis of the data collected.

The writer believes, however, that there are features presented in the varying behaviours of the trees in many of these trial plots during the quarter of century which has elapsed since most of them were first submitted to the various treatments, that may perhaps, be deemed to possess some slight interest and value in a qualitative sense to fruit growers working under similar conditions of soil and climate in South Australia.

In presenting his subsequent statements and comments on these trials, he would ask those who may have been privileged to have been trained in modern methods of horticultural research, to try to visualise the position which existed in that field of work at the time these trials were instituted. They will, it is confidently assumed, be prepared to admit that it has been largely out of the faulty and often negative results of the work of earlier experimenters that the evolution of more accurate methods has been hastened and the achievement of more definite results has been stimulated.

It is fully recognised that in so far as planning and carrying into effect any such long distance experiments and research work in this orchard in the future is concerned, these recently developed forms of procedure must be adopted. Briefly stated, any such experiments will necessarily be composed of trees in each of which the chief component factors—rootstocks and scions—shall be as uniform as parentage and propagational methods can determine. There shall not only be a considerably greater number of such trees used in each comparative test, but they must also be distributed in numerous replications throughout the area devoted to the trial.

Apart from the above programme of comparatively permanent work, problems of a seasonal character such as the methods of preventing the ravages of fungoid and insect pests from which fruit trees suffer, have occupied a considerable degree of attention from those in charge of the orchard.

The effects of the application of many spraying and dusting compounds when used in accurate proportions and at definite periods, as well as the use of various insect traps and bandages, have each been the object of specially designed trials.

The introduction, breeding, and distribution of the minute parasitic wasp (*Aphelinus mali*)—of which the American Woolly Aphis of the apple tree is the principal host—has been a signal success, and gratifying results have been achieved from its assistance by numerous apple growers located in the cooler districts of the State to whom it has been distributed. The results of all of these trials have been carefully recorded and published in the Departmental *Journal of Agriculture* and in bulletin form from time to time.

(*To be continued.*)

NITROGENOUS FERTILISER EXPERIMENTS WITH BARLEY AND OATS IN SOUTH AUSTRALIA.

[By R. C. Scott, R.D.A., Supervisor of Experimental Work.]

During the past season (1934-5) a series of experiments dealing with the value of sulphate of ammonia was carried out in South Australia in co-operation with Nitrogen Fertilisers, Ltd.

The object of the experiment was to endeavour to determine the effect of this fertiliser when, in addition to a basal dressing of superphosphate, varying quantities were drilled in with crops of barley and oats seeded on non-fallowed land.

The work was confined to the better rainfall districts since previous experience has shown that in areas where rainfall is the limiting factor, and ripening conditions for cereal crops relatively severe, full benefit from applications of nitrogenous fertilisers cannot be anticipated.

Further, only non-fallowed ground was utilised as, by work at both the Waite Research Institute and the State Experimental Farms, it has been clearly indicated that crops sown on well worked bare fallow do not appreciably respond to nitrogenous fertilisers. Consequently, if sulphate of ammonia is to be of any importance to South Australian farmers it must be as a manure for stubble-sown crops of which barley and oats are typical in this State, whilst finally it must be pointed out that a nitrogenous fertiliser can in no way replace superphosphate, but must be used as an addition to that manure.

Plots were established at 11 centres extending from the South-East of the State, South of Adelaide, and the Lower North to Yorke Peninsula and Kangaroo Island. Barley was seeded in eight instances, and oats in four, both cereals being planted in the plots situated at Gawler River.

The basic dressing was 1cwt. of 45 grade superphosphate, and in five series the nitrogenous manure added comprised ½cwt., 1cwt., and 2cwt. applications of sulphate of ammonia. However, in all other cases only the two first-named quantities, namely, the ½cwt. and 1cwt. dressings were applied in addition to the phosphatic fertiliser. In all plots the experiment was fully replicated so as to eliminate any errors that may have occurred because of soil variation. The results obtained are shown in the following table:—

EXPERIMENTS WITH SULPHATE OF AMMONIA, 1934-35.

Barley.

Experimenter.	1cwt. Super. Bush.	1cwt. Super., ½cwt. Sulph. Ammonia. Bush.	1cwt. Super., 1cwt. Sulph. Ammonia. Bush.	1cwt. Super., 2cwts. Sulph. Ammonia. Bush.
Seager Bros., Hawk's Nest, K.I.	35.2	47.9	55.1	65.3
W. R. Boxer, Wisanger, K.I. ..	28.0	38.1	47.4	51.7
W. J. Dawkins, Gawler River ..	4.6	12.0	16.4	23.3
Lovelock Bros., Aldinga	26.5	31.0	37.3	43.2
C. B. Mitchell, Mt. Gambier	55.5	58.8	53.4	—
H. Hutchesson, Millicent	37.8	41.6	47.6	—
P. Ball, Warooka	30.7	34.6	32.0	—
S. Brundell, Stansbury	10.8	12.4	14.2	—

OATS.

Experimenter.	1cwt. Super. Bush.	1cwt. Super., ½cwt. Sulph. Ammonia. Bush.	1cwt. Super., 1cwt. Sulph. Ammonia. Bush.	1cwt. Super., 2cwts. Sulph. Ammonia. Bush.
W. J. Dawkins, Gawler River ..	6.3	19.3	24.3	35.8
Lewis Bros., Tintinara	20.1	24.8	29.9	—
A. M. Densley, Keith	16.4	16.0	16.3	—
Experimental Farm, Kybybolite .	7.7	7.9	9.0	—

In connection with the above returns, it should be kept clearly in mind that they are the results obtained in a single season, and therefore must be confirmed before any definite conclusions can be drawn.

Moreover, they were secured in a season in which the weather was far from normal, being severe on slow-developing plants in the early stages, and favourable for full maturity of bulky crops in the later stages. However, the results obtained appear to indicate that, under special circumstances, sulphate of ammonia is of value in the cultivation of stubble sown cereal crops, but, on the other hand, unless these special conditions obtain, its use is not economic.

The particular circumstances mentioned appear to be connected with the previous history of the field to be seeded and the character of the plants or herbage which it has carried.

Where the land normally produces strong growing leguminous pasture plants or has recently carried a good leguminous crop, the response of stubble-sown cereals to sulphate of ammonia applications is not appreciable, but in the case of land on which leguminous plants have not been abundant the effect of this fertiliser is much more marked.

The experimental fields at Hawk's Nest, Wisanger, and Gawler River may be included in the latter class, and the mean barley yield from the plots at these three centres is as follows:—

	Bush. Per Acre.
1cwt. superphosphate	22.6
1cwt. superphosphate, ½cwt. sulphate ammonia	32.7
1cwt. superphosphate, 1cwt. sulphate ammonia	39.6

It will be seen from these returns that considerably higher yields followed the sulphate of ammonia applications, and that such increases were distinctly profitable. On the other hand, if the returns from the remaining five centres, where the land on which the experimental plots were placed normally carries a strong leguminous pasture, are examined, the average return is:—

	Bush. Per Acre.
1cwt. superphosphate	32.3
1cwt. superphosphate, ½cwt. sulphate ammonia	35.7
1cwt. superphosphate, 1cwt. sulphate ammonia	36.9

In this case the cash value of the increased yield following the sulphate of ammonia dressing is just above the price of the fertiliser when ½cwt. is applied, and insufficient to meet the cost of the manure when 1cwt. is added.

The same position occurs with the oaten plots, and when the yields from those at Gawler River are excluded the mean returns for the remainder are 11.1bush. for 1cwt. superphosphate, 12.2bush. for 1cwt. superphosphate plus ½cwt. sulphate of ammonia, and 13.8bush. for 1cwt. superphosphate plus 1cwt. of sulphate of ammonia. The differences, therefore, are not appreciable, whereas at Gawler River the yields were very materially increased by sulphate of ammonia dressings.

From the foregoing returns it is evident that the influence of this fertiliser varies considerably from centre to centre. Consequently, the experiment must be continued and further information gained before any conclusions can be arrived at or recommendations made.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 11.—HOARY CRESS.

Lepidium Draba, L.

Hoary Cress, known also as "White Weed," and sometimes as "Chalk Weed" on account of a supposed preference for calcareous or chalky soils, has already been described in the pages of this *Journal*. In the issue of June, 1933, there appeared a brief but excellent account by Mr. W. C. Johnston, District Agricultural Instructor for the Lower North.* A more comprehensive account by A. Morgan, B.Agr.Sc., Weeds Research Officer of the Victorian Department of Agriculture, is to be found in the *Journal of Agriculture* of Victoria for August, 1931, October, 1931, and, more recently, January, 1934. An extensive series of observations and experiments carried out over a period of several years at the State Research Farm at Werribee, Victoria, has enabled the last-named writer to supply much useful information as to the habits of the plant and valuable data bearing upon its control and eradication, and the interested reader is referred to Morgan's papers for a full discussion of the problems involved. The following notes aim to stress the importance of early recognition in the case of this most important weed, and to make available to South Australian farmers, in a summarised form, the main conclusions reached by Morgan as a result of his experience at Werribee.

The name "Hoary Cress" is on account of the slight hoariness or whitish appearance of the foliage, due to a covering of very fine hairs. The plant is an introduced Cruciferous weed, native originally to Europe, whence it has spread to Western Asia, and, in fact, to most temperate countries of the world. On account of its deep-rooted and perennial habit, it is rightly considered to be one of the most serious weed pests of arable land, and in view of its very wide distribution in this as well as in other States of the Commonwealth, its early recognition and control are matters of unusually great importance to the farming community of South Australia. It is especially troublesome in wheat lands, from which its eradication is extremely difficult, and though the older plants are easily recognisable when in flower, it has been found that flowers are not formed until the second year of growth, by which time the root system is sufficiently well developed to present difficulties in eradication. This means that very often the presence of the weed is noticed only after it has become firmly established in the new situation.

The individuals vary somewhat in appearance at different stages of their growth and development. Young plants, and especially those growing on summer fallows, usually have a "rosette" form, consisting of one or more circlets of leaves, which arise close to the ground from a stem which is very short and inconspicuous. These rosette or radical leaves are of a different shape from those subsequently formed on the stems, and are continuous at the base with a slender leaf-stalk or petiole, which is absent from the stem leaves. The rosette plants are usually to be found connected with neighbouring plants by means of horizontal roots of considerable length, from which they arise mostly as buds. Towards the flowering period the older plants develop an erect stem, which grows to a height of about 18in., and bears leaves alternately at the nodes. The stem leaves are about 3in. long, and an inch or more broad, oblong-lanceolate or oblong-ovate in shape, with irregularly serrated edges and wavy margins. They differ from the rosette or radical leaves in being devoid of a stalk, and in being provided at the base with a

*See also E. W. Pritchard, *S.A. Journal of Agric.*, July, 1928.

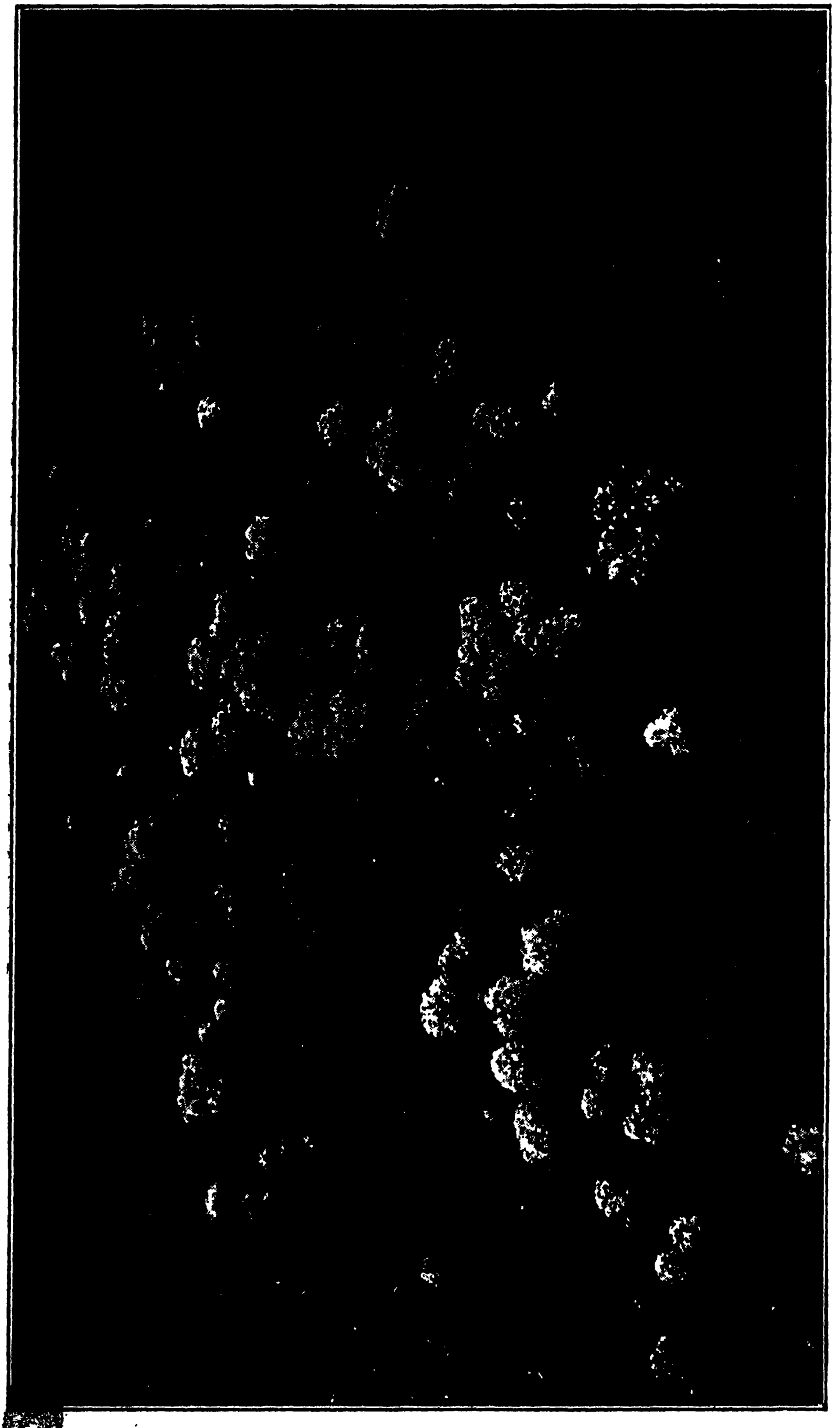
pair of auricles which clasp the stem at the node. Branches arise in the upper leaf-axils, and these in turn branch again and again to form the characteristic flat-topped inflorescence of small crowded white flowers.

Botanical Name and Classification.—*Lepidium,* from the Greek *lepis* "a scale," is said to be in allusion to the scale-like form of the pod in many species of the genus; the species name is probably based upon some resemblance to *Draba,* another genus of *Cruciferae.* The derivation of this name (Greek *drabe* meaning "pungent" or "acrid") expresses a character which is extremely common in *Cruciferae,* but by no means confined to either *Lepidium* or *Draba,* namely, the presence of pungent or sharp-tasting substances in the plants, *e.g.,* mustard, radish, etc.

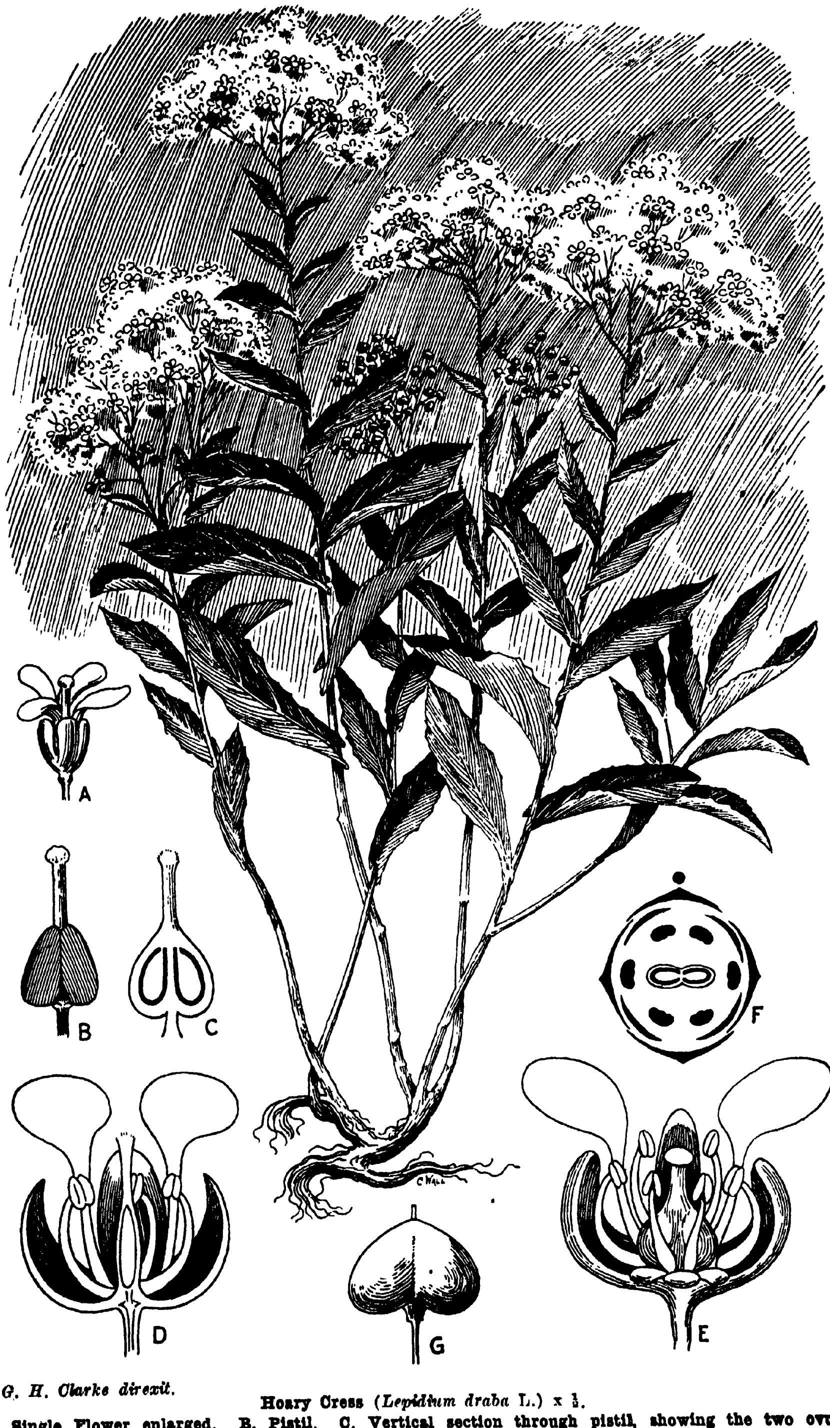
The family *Cruciferae,* to which these plants belong, forms a very natural and well-defined assemblage of about 2,000 species contained within more than 200 genera, and among which are many plants of economic value as vegetables, *e.g.,* cabbage, cauliflower, kohl-rabi, Brussels sprout, turnip, swede, radish, etc.; or as condiments, *e.g.,* mustard; while a host of others have a negative importance as weeds, *e.g.,* Charlock, Wild Mustard, Wild Turnip, Hoary Cress, etc. A very common Cruciferous character is the flat-topped or corymbose inflorescence of small flowers, which are most often white or yellow in colour. This inflorescence usually becomes racemose or cylindrical as the fruits mature, due to lengthening of the stem or main axis. The individual flowers are very uniform in structure, and the cross-like arrangement of the normally four flower petals gives to the family its name (Latin *crux, crucis,* "a cross", and *fero,* "I bear"). The Cruciferous flower is regarded by most authorities as having been derived from a structure consisting of an axis bearing six superimposed whorls of parts arranged alternately at right angles, each whorl consisting of two segments, *viz.,* two whorls of sepals, one of petals, two of stamens, and one of carpels. The actual occurrence of four segments in certain whorls, as for example, in the petaline and inner staminal whorls, is supposed to have resulted from the splitting or branching into two of originally single primordia. Thus the typical Cruciferous flower consists of an axis bearing two whorls each of two sepals, a single whorl of four petals diagonally arranged, an outer whorl of two stamens laterally placed, an inner whorl of four stamens, which are longer and situated in pairs close to the median plane, and a single whorl of two united and superior carpels (see floral diagram on the accompanying plate). The fruit is a pod of varying length, usually divided laterally into two compartments by a membranous partition or septum. This septum often remains attached to the stalk at maturity after the lateral walls have fallen away and set free the seeds. In a few cases, *e.g.,* in the radish (*Raphanus spp.*) the pod undergoes transverse segmentation, and in some, *e.g.,* Hoary Cress, it is indehiscent. The pod of *Cruciferae* is termed a *siliqua* when its length exceeds its breadth, and a *silicula* or *silicule* when it is broader than long.

While the characters of the family itself are very sharply defined, the separation of the *Cruciferae* into genera is a matter of considerable difficulty. The presence of short flattened scale-like siliculae with the valves or sidewalls folded and keeled at right angles to the median septum, and with only a single seed in each lateral compartment, is characteristic of two genera of *Cruciferae,* namely, *Lepidium* and *Iberis* (garden Candytuft). *Lepidium* is distinguished from species of Candytuft by its smaller flowers, and by having the petals, when present, equally developed, whereas in *Iberis* the two outer or anterior petals of the flower are larger than the two inner or posterior ones.

Lepidium comprises about 100 species, spread over the temperate and warmer parts of the globe, but not present in alpine regions. Species of the genus are often referred to as "Pepperwort" or "Cress," the latter name being due to the Asiatic species *L. sativum,* L., which is the garden Cress. The name "Cress" is



Hoary Cress growing in pasture.



G. H. Clarke direxit.

Hoary Cress (*Lepidium draba* L.) x ½.

A. Single Flower enlarged. B. Pistil. C. Vertical section through pistil, showing the two ovules. D. Median vertical section through flower. E. Flower seen from front (one sepal and two petals removed). F. Floral diagram. G. Fruit. (All except A. much enlarged).

applied also to certain other Cruciferous plants, *e.g.*, Swine Cress (*Coronopus spp.*) and Water Cress (*Nasturtium officinale*, R. Br.). It may be mentioned in passing that the last-named has no connection with the so-called garden "Nasturtium" (*Tropaeolum majus* L.), which belongs to an entirely different family. The genus *Lepidium* is well represented in Australia, and in this State, where there are some 12 native species, in addition to the introduced *L. Draba.*

Hoary Cress is to be distinguished from other Lepidiums, firstly, by the inverted heart-shaped pods, which are not winged or notched at the summit, and are borne on pedicels much longer than the pods themselves; secondly, by the broad and auriculate stem-clasping leaves; and, thirdly, by the great depth and extensiveness of the root system.

Botanical Description.—An erect hoary perennial with rigid stems; leaves oblong-lanceolate or oblong-ovate, sinuate-toothed, 2 to 4in. long, 1in. or more broad, the radical ones petiolate, the cauline ones sessile and clasping the stem with acute auricles; flowers numerous, small, in a terminal corymbose panicle; petals white, twice as long as the sepals, each with a slender claw; stamens 6; fruiting pedicels 2 to 3 times as long as the pod, which is cordate, neither winged nor notched, indehiscent, and surmounted by the prominent style. Period of flowering:—August to December.

Properties.—Hoary Cress is almost entirely useless, and though stock may eat it to some slight extent, any value it may have in this regard is more than offset by the very severe competition to which it subjects more valuable plants, with consequent reductions in yield from both crops and pasture. Considered as a weed, the plant exhibits three formidable characters—it spreads rapidly, establishes itself quickly in the soil, and when once established is extremely difficult to get rid off. It forms large numbers of small fruits, which are easily transported to new situations, and it spreads locally by the formation of new shoots which arise as buds from the more superficial parts of the root system. The difficulty of eradication is mainly due to the great development and vigour of the underground parts. The roots contain large reserves of food, and even small detached fragments are capable of forming new aerial plants, so that occasional cultivation merely spreads and stimulates the growth of the weed. The main roots extend downwards in the soil to a depth of 6ft. of more, producing, at some distance below the ground level, lateral branches, which also penetrate deeply, and, at a higher level, horizontal branches which extend laterally below the surface and may form new plants before turning finally downwards into the deeper parts of the soil.

Control and Eradication.—Under dry farming conditions the advantage in competition lies with Hoary Cress unless its vigour has been reduced by previous cultivations sufficiently to give the crop an advantage which can be successfully maintained; and in the case of large infested areas, where considerations of cost preclude any systematic attempts at eradication, and where the land is required for cropping purposes, the application of measures designed to this end is about as much as can be done, though eradication is not achieved thereby, nor indeed is there any lasting impairment of the vigour of the weed. In irrigated areas, however, the advantage in competition can be maintained, as Morgan points out, by lucerne or permanent pasture, given adequate watering and manuring and proper grazing management. Under such conditions Hoary Cress is forced "under cover," and can be effectively controlled, though here again there is no actual eradication, subsequent ploughing up of the ground being followed by a luxuriant growth of the weed.

In the case of small areas of infestation eradication is possible, and is worth while, though the operations may be both laborious and costly. Omitting plant competition, which has already been mentioned, Morgan discusses the methods of control under four headings, namely, cultivation, salting, carbon bisulphide, and chemical sprays.

As regards cultivation, he recommends persistent cultivation at regular fortnightly intervals for a period of not less than two years. In the experiments conducted at Werribee complete eradication was effected by this method, shallow cultivations being made, using a weed knife attached to the cultivator. In the case of small patches the use of the hoe is recommended.

The value of salt as a weedicide is dependent upon the type of soil in which deep-rooted perennial weeds are growing, and, in such cases, is not of much use unless the subsoil is sufficiently permeable to allow of penetration of the salt in

Mature plant of Hoary Cress.

lethal amounts to a depth of at least 2ft. Given the required conditions of subsoil permeability, however, salt is stated to be an effective means of eradicating Hoary Cress, the amount required varying, according to the density of the infestation, from 5 tons to the acre upwards. A disadvantage of using salt is the residual effect it leaves upon the soil, but this, however, is not necessarily permanent.

Carbon bisulphide is very useful in situations where the soil is both porous and dry, though the cost is too great to allow of its being employed on a large scale. Quantities of from 1½ozs. to 2ozs. of the liquid are introduced into holes specially bored in the ground to a depth of 18in., and situated about 2ft. apart, the holes being then sealed up so as to allow the vapour to diffuse into the soil air in

sufficient concentration to kill the roots of the weed. This method is said to be extremely valuable in the case of small patches, given the required conditions of soil porosity and dryness.

As regards chemical sprays, the most important are the *chlorates,* especially sodium chlorate, and *arsenical* compounds, such as arsenic pentoxide and acid sodium arsenite. The chlorates have the advantage of being non-poisonous to stock, excepting in large amounts, but they are liable to cause clothing, &c., to ignite spontaneously when it becomes dry after being wetted with the spray solution. Though sodium chlorate has been used with success in this State, the experiments conducted by Morgan at Werribee tend to show that the chlorates are inferior to arsenical sprays as eradicants of Hoary Cress. From the reports of other workers referred to by Morgan, it seems likely that it may be possible to raise the efficiency of chlorate sprays by adding certain other materials. As with salt, the soil is adversely affected by the application of chlorates, but not for so long a period.

As regards the arsenical compounds, a 6 per cent. solution of arsenic pentoxide, applied as a misty spray under a pressure of 100lbs. to the square inch, and at a rate of 120galls. per acre, was originally recommended by Morgan. In a more recent paper, however, he advises the use of an acid sodium arsenite spray as being much cheaper and equally effective. A stock solution is made by mixing 4lbs. of white arsenic and 1lb. of caustic soda in 2½ pints of water, stirring until dissolved, the spray solution being prepared by making up 1 part of stock solution in 100 of water, and adding slowly, and with constant stirring, 5 parts of sulphuric acid.

To ensure success, it is necessary to kill all the roots to a depth in the soil sufficient to prevent their forming new shoots capable of reaching the surface. Experiments carried out by Morgan in order to determine the critical depth of root-kill showed that, under favourable conditions, the root system was killed to a depth of 2ft. or more, but that the depth of penetration varied considerably, and was influenced by a number of factors. It was found that the conditions most favourable to "remote penetration" by the spray are those producing a high rate of transpiration, namely, high temperatures, low atmospheric humidity, and decrease in soil moisture. On the other hand, such conditions favour the evaporation of the spray fluid, thus hindering its absorption by the plants, a difficulty which can be overcome, however, by spraying late in the day or by re-spraying with water the following morning. Thus Morgan concludes that—

> ". . . . the absorption and translocation of the arsenical spray within the root system of the plant is directly due to the establishment within the vascular system of the plant of a 'water deficit' or 'sub-atmospheric pressure' as a result of the excess of water lost through transpiration over that absorbed from the soil."

The arsenical spray kills the surface cell layers of the plant, and also renders them permeable. The arsenical solution becomes mixed with the sap and enters the conducting vessels, its downward passage to the roots being facilitated by the negative pressure in these vessels. Accordingly, the essentials for the successful use of arsenical sprays are summarised by Morgan as follows:—

(*a*) Apply in hot, dry weather, when the transpiration rate is high, and late in the day in order to obviate poor absorption, due to evaporation of the spray fluid. If necessary, re-spray lightly with water the morning following spraying.

(b) Apply to plants whose root systems have not been disturbed by cultivation for some considerable time, otherwise root fragments in the soil devoid of top growth will not receive any weedicide.

(c) Apply to well-grown plants whose leaf and stem surface is sufficient to hold a reasonable amount of the spray fluid during the time required for absorption. This ensures the absorption of the poison in sufficient quantities; also, since the reserves of food in the roots are probably lowest at this time, plants sprayed at this stage doubtless have less chance of recovery.

(d) Apply only to plants under dry-farming conditions, since the water deficit of plants growing in moist situations is rarely large enough to ensure good absorption and penetration of the weedicide.

REFERENCES.

1. Johnston, Worsley C., R.D.A.—"A Review of Some of the Cruciferous Weeds Occurring in South Australia, with Particular Reference to the Lower North." *Journal of Agriculture, S.A.*, XXXVI., 11, June, 1933.

2. Morgan, A., B.Agr.Sc.—(a) "Experiments in Hoary Cress Control," *Journal of Agriculture, Victoria*, XXIX., 8 and 10, August-October, 1931. (b) "Hoary Cress Control," Idem. XXXII., 1, January, 1934.

INSECTS OBSERVED ON CROPS IN SOUTH AUSTRALIA DURING PERIOD JUNE, 1932, TO JUNE, 1934 (1).

[By J. DAVIDSON, D.Sc. (Waite Agricultural Research Institute, University of Adelaide).]

The incidence of insect pests is closely associated with meteorological events. In South Australia, with its characteristic winter rainfall and summer dryness, rainfall is the dominating factor. In Figs. 1 and 2, monthly rainfall and temperature data for the two years under review are shown graphically for eight selected stations in the State. The stations have been chosen, as far as practicable, so as to embrace the more important agricultural centres. The total monthly precipitation at each selected station is shown as being above or below the average rainfall for the month at the station; the latter averages are based on records extending over a long series of years. The temperature line shows the average daily temperature for the month $(\frac{\text{max.} + \text{min.}}{2})$; the departures from the mean temperature for the month, based on a long series of records, are too small to allow of their being illustrated by the hatching method adopted in the case of rainfall.

It is more suitable to retain the normal full year for presentation of the meteorological data, although the insect records are more conveniently closed at the end of June.

I am indebted to Mr. H. Womersley and Mr. A. L. Tonnoir for considerable assistance in the identification of specimens; also to officers of the Department of Agriculture who have so kindly co-operated with me in obtaining records.

1. CEREAL CROPS.

No particular observations to record.

2. PASTURE AND FORAGE CROPS.

The scarab beetle (*Aphodius tasmaniae* Hope) has developed into an important pest in certain districts of the South-East. The beetles normally make flights in swarms about February, and eggs are laid in the soil in favourable situations. The grubs (larvae) become active with the onset of the autumn rains. They make vertical burrows in the soil 6-8in. deep, from which they emerge at night and eat clover and grass seedlings; the soil from the burrows is scattered over the infested area, which assists in smothering the damaged seedlings: this results in bare patches developing in the pastures (D. C. Swan, *Journ. Agric. S. Aust.* 37, 1149-1156, 1934).

The wandering grasshopper (*Chortoicetes terminifera* Walk. = *Calataria terminifera* Walk.) occurred in plague numbers during 1933 and 1934. The swarms of winged grasshoppers originally spread from northern areas of the State. It appears that the pastoral country about the 10in. annual isohyet may be considered as the main region permanently inhabited by the species. In years which favour its multiplication in mass numbers, the winged forms migrate southwards over the agricultural districts. This occurred in the summer and autumn of 1933-1934, and eggs were laid freely in the infested northern agricultural areas. Hoppers hatched freely from these eggs in the spring of 1934, and the infestation

[1] Third series of records. For the second series, see this *Journal*, vol. 36, pp. 283-286, 1932.

became widespread over the northern and mid-northern agricultural districts during the summer of 1934-1935. Considerable damage was caused in pasture areas and wheat crops in some districts.

The Government of South Australia passed the "Noxious Insects Act, 1934," and regulations under this Act defined the responsibilities of occupiers of land and district councils with regard to control measures. This ensured an efficient co-ordination of control measures throughout the State. A general account of the control measures adopted in similar campaigns is given by J. Davidson (*Journ. Agric. S. Aust.* 37, 619-624, 1934).

Experience of previous grasshopper infestations in this State shows that the invasion of the agricultural areas is temporary, and the insects normally disappear after one or two seasons. It is possible that the species may occur permanently in small numbers, more or less solitary, in suitable local areas in the agricultural districts. A survey is being made by the Waite Agricultural Research Institute in co-operation with the Department of Agriculture and the Pastoral Board, in order to define the areas in the State where the species is permanently established. A study is being made also of the causes which result in plague infestations in particular years.

The lucerne flea (*Smynthurus viridis* L.) did not occur in widespread infestation numbers during 1934; this was associated with low rainfall during the early winter months. Control measures under South Australian conditions are discussed by J. Davidson (*Journ. Agric. S. Aust.* 36, 994-1006, 1933; and Bull. 286, Dept. Agric. S. Aust., 1933). This species is a serious pest of clover and lucerne pastures in the winter rainfall areas of Australia (see J. Davidson, *C.S.I.R. Aust.*, Bull. 79, 1934).

The Bdellid snout mite (*Biscirus lapidarius* Kramer), a predator of the lucerne flea, was placed in certain experimental pasture areas in South Australia during July and August, 1933 (see G. H. Currie, *Journ. C.S.I.R. Aust.* 7, 9-20, 1934); a few individuals were found in two centres the following winter, but the colonies have not made progress in these situations. It is possible that owing to the low rainfall in the early winter of 1934, the conditions were too dry; from its known distribution in Western Australia and Tasmania, the species appears to be best suited to cooler, wet situations.

An allied species (*B. intermedius* Sig. Thor.) has been found in several districts in the better rainfall areas of the State. A preliminary account of the snout mites (Bdellidae) in Australia is given by H. Womersley (*Trans. Roy. Soc. S. Aust.* 57, 97-107, 1933).

The hay-itch mite (*Pediculoides ventricosus* Newport) which appears to be associated with a skin irritation occurring from time to time amongst agricultural workers handling hay and chaff, has been isolated from haystacks and chaff in certain districts. An account of investigations made on the species is given by D. C. Swan (*Journ. Agric. S. Aust.* 37, 1289-1299, 1934; and *Med. Journ. Aust.* 2 (21st yr.), 573-578, 1934).

3. FIELD AND MARKET GARDEN CROPS.

The red-legged earth mite (*Halotydeus destructor* Tucker) is extending its range as a pest in South Australia. It favours particularly weedy situations from which it invades seedlings of various market garden crops; in south-western districts south of Adelaide, it is becoming more widely established as a pest of seedling vegetables in gardens. Up to the present it is not a pest of clover pastures, which appears to be the case in Western Australia. Damage was caused in tomato

glasshouses on sandy soils on the Adelaide Plains, by the mites feeding on seedling tomato plants; the mites invade the houses from adjacent weedy ground, at night or on dull days. The present position regarding this species is discussed by D. C. Swan (*Journ. Agric. S. Aust.* 38, 353-367, 1934). The blue oat mite (*Penthaleus major* Dugés) occurs commonly in the same situations as *H. destructor*; its habits are similar, but it appears to favour grasses. This species was originally described by Froggatt as *P. bicolor*. It has been established recently by H. Womersley that the species agrees with the European *P. major* (see D. S. Swan, *Journ. Agric. S. Aust.* 38, 365, 1934).

The potato moth (*Phthorimaea operculella* Zeller) was particularly in evidence in potato crops in the field during 1934; this is associated with the unusual dry conditions. The larvae mine freely in the leaves and haulm, and the plants become black and withered, resulting in decreased yield. Clouds of moths were observed in a potato crop in the Mount Barker district in autumn, 1934. In the dry soil the tubers become readily infested with the caterpillars; special precautions are desirable in order to ensure that the tubers are well drilled.

The lucerne flea (*Smynthurus viridis* L.) destroyed four acres of seedling mangolds near Noarlunga in October, 1932; two sowings of the crop were destroyed.

The Rutherglen bug (*Nysius vinitor* Berg) was troublesome on potatoes in the Adelaide hills district in December, 1932.

The gladiolus thrips (*Taeniothrips gladioli* Moulton and Steinweden 1931) is developing as a serious pest of gladioli; it has been observed in several gardens in the Adelaide district. The thrips may be present in the corms before planting; they congregate particularly in the leaf sheaths of the growing plant, and scarify the surface of the developing leaves. The latter present a bleached and mottled appearance in the summer, and the blooms may be weak and distorted. I am informed by Miss H. V. Steele, who has been making a study of thrips, that this species is the same as *Physothrips simplex* Morison 1930, so the latter name will have priority. Miss Steele's observations on this matter will be published shortly.

4. FRUIT CROPS AND VINES.

The apple blossom thrips (*Thrips imaginis* Bagnall) was present in smaller numbers during the spring of 1932 compared with 1931, and infestation of apple blossom was unimportant. The general fluctuations in the numbers of this insect are closely correlated with weather factors. The numbers are small during midsummer months owing to dryness; there is a rise in numbers in autumn (autumn rise) which falls with the onset of the winter months; there is an increase in the early spring (first spring rise), which is followed by a later increase (second spring rise); there may be subsequent increases in numbers due to development of later generations. If the spring weather is favourable and the first spring rise occurs early (August or early September), a large second spring rise may develop in October at the time when the apple is in blossom. With favourable weather, this may result in a heavy infestation of the blossom. Owing to the cold, wet conditions in October, 1932, the peak numbers did not develop until early December. Observations on the factors affecting the seasonal fluctuations of this species in South Australia are discussed by J. W. Evans (*Journ. C.S.I.R. Aust.* 6, 145-159, 1933; and 7, 61-69, 1934). Some observations on derris and pyrethrum dusts used in experiments on the control of this species are given by H. W. Wheeler (*Journ. C.S.I.R. Aust.* 7, 70-72, 1934).

The present position regarding the investigations on this species is described by J. Davidson (*Fruit World of Australasia,* Melbourne, 35, 667-669, 1934).

The following species of blossom-inhabiting thrips commonly occur in South Australia in association with *Thrips imaginis* in flowers and fruit blossom:—The

onion thrips (*Thrips tabaci* Lind); the Eucalyptus thrips *Isoneurothrips australis* Bagnall); *Haplothrips victoriensis* Bagnall. *Taeniothrips* (*Physothrips*) *kellyanus* Bagnall has been taken in the blossom of lemon trees.

The pear and cherry slug (*Caliroa limacina* Retz = *cerasi* Linn.) appears to be generally distributed throughout the fruit-growing areas of the lower South-East of the State. It also occurs in the Adelaide hills district.

The codlin moth (*Cydia pomonella* Linn.) was normal. Mr. R. Fowler has described the results of further experiments on the control of this pest (*Journ. Agric. S. Aust.* 36, 647-661, and 1368-1370, 1933).

The light-brown apple tortrix moth (*Tortrix postvittana* Walk.) was observed damaging the rind of oranges in July, 1932. This species, which is a native of Australia, is not a pest of the apple tree in this State, as appears to be the case in the cooler countries, New Zealand and Tasmania. It may be controlled on apple trees in this State owing to the spraying schedule againgst codlin moth. The laryae frequently occur on grape bunches on vines, and in generel it has a fairly wide range of hosts. A useful paper on this insect has been written by L. J. Dumbleton (*New Zealand Journ. Sci. Techn.* 14, 83-92, 1932).

The orange butterfly (*Papilio anactus* Macleay) is occasionally seen on the Adelaide plains, and in irrigated orange groves on the River Murray. The yellow-banded larvae were taken feeding on young leaves of Pomeroy orange.

The larvae of the painted apple moth (*Orgyia anartoides* Walk.) occurred in numbers on young apple trees in the Millicent district in January, 1933; also at Cherry Gardens in March and April. It was found damaging leaves of quince in Myponga district. The larvae feed on the green tissues of the leaves, affected leaves being reduced to a skeleton.

The flea beetle (*Arsipoda kingensis* Blkb.) occurred in large numbers on apricot and mulberry trees in an orchard at Berri in February, 1934. It was also recorded on fruit trees at Waikerie.

The cherry green beetle (*Diphucephala colaspidoides* Gyll.) occurred in plague numbers in the Mount Compass district in November, 1932; it damaged the foliage and fruit of apple trees.

The dried fruit beetle (*Carpophilus hemipterus* Linn.) damaged pears on the drying racks at Berri in 1934. This beetle may cause serious damage to dried pears in store; treatment with sulphur-di-oxide is generally adopted.

The Coreid bug (*Serinetha lurida* Dallas)* invaded figs on the trees in large numbers at Berri in March and April, 1934.

The cockroach (*Phyllodromia supellectilium* Serv.) was recorded heavily infesting mature sultana grapes on vines at Renmark in the autumn of 1933.

The tree Katydid (*Caedicia olivacea*) was found feeding on the rind of oranges (Thompson's improved navel) at Berri; serious surface blemishes were produced on some of the oranges.

The pear leaf blister mite (*Eriophyes pyri* Pagenst.) was active in certain districts in the Adelaide hills during October and November, 1932.

The green peach aphis (*Myzus persicae* Sulz.) was present in fair infestation numbers on peach trees only in a few local situations. Infestation may develop during August to November. Winged re-migrants were observed returning to peach trees in the Light's Pass district in May and June, 1932, and at Blackwood Orchard in April, 1933. In the latter case, sexual females were present on the trees at the end of April.

*Kindly identified by Mr. K. McKeown, Australian Museum, Sydney.

From 100 peach twigs collected in Angaston district in July, 1932, 21 viable eggs were obtained. Several eggs had hatched, and newly hatched aphides were present; most of the eggs on the trees had hatched by the end of August. From 150 peach twigs taken from Blackwood Orchard on July 14th, only 11 eggs were obtained. Where tar-distillate dormant sprays have been employed, satisfactory control of the pest has been obtained. A useful paper on this species is written by K. M. Ward (*Journ. Dept. Agric. Vict.*, vol. 32, 1934).

The cherry aphis (*Myzus cerasi* Fab.) commonly occurs on cherry trees in the Adelaide hills district, but infestations are generally light.

The apple leaf hopper (*Typhlocyba australis* Frogg.) occurs on apple trees in some districts in the Adelaide hills; in certain years it causes considerable mottling of the leaves. A useful paper on this species is contributed by L. J. Dumbleton (*New Zealand Journ. Sci. Techn.* 16, 30-38, 1934).

5. MISCELLANEOUS OBSERVATIONS.

Mole crickets (*Gryllotalpa coarctata* Walk.) were more troublesome than usual in the late summer and autumn 1933-1934 owing to dry weather. They caused damage in tomato houses, lawns, and seedbeds in nursery gardens on the sandy soils of the coastal regions of the Adelaide plains. Where practicable, as with lawns, covering with straw and flooding brought the insects to the surface; they could be then readily destroyed, and satisfactory control was obtained. Injection of carbon-disulphide into the soil also gave satisfactory control.

Zinc phosphide bait appears to give good control of mole crickets in Italy (*Ett. Malenotti, Giornale di Agricol. d. Dominica*, December 8th and 29th, 1929).

The common species of blowflies in the Adelaide district are:— *Lucilia sericata* Meigen, *Chrysomyia rufifacies* Meig., *Microcalliphora varipes* Macq., *Calliphora stygia* Meig., *C. novica* Hardy. Their seasonal occurrence is described by J. Davidson (*Journ. Agric. S. Aust.* 36, 1148-1153, 1933).

The weevil (*Ethemaia sellata* Pascoe) was found in large numbers feeding on a dense patch of Malva (*M. parviflora* L., *M, nicaeensis*) near Adelaide; the dense growth of the weed was defoliated by the insects early in the winter, but the plants made vigorous regrowth again in early spring. The insect has now been found to occur on wild mallow throughout the Adelaide district.

The fern weevil (*Neosyagrius cardipennis* Lea) was found damaging maiden hair ferns near Adelaide in the summer of 1933. The Tenebrionid beetle (*Pterohelaeus piceus* Kirby) was recorded in large numbers around the base of orange trees. As many as 100 beetles were taken round one tree, and it appeared that the rough bark at the base of the tree had been eaten.

The beetle *Polyphrades pella* Blkb. was feeding on the foliage of Tuart gum trees (*Eucalyptus gomphocephala*) at Barmera in March, 1934, together with the case moth (*Animula herrichi* Westw.).

The ladybird *Orcus australasiae* Boisd. was found actively feeding on colonies of *Pineus pini* L., on *Pinus radiata* in December, 1933; the mite, *Oribatula tibialis* Nicolet, is commonly associated with it. The beetle *Bruchus pisorum* L. was found in a consignment of peas from India. This species is not recorded from South Australia; the allied species *B. obtectus* Say. and *B. chinensis* Thunb. have been recorded.

The drug store beetle (*Sitodrepa panicea*) was found infesting seeds of tomato.

The clothes moth (*Tineola biselliella* Haw.) heavily infested fleeces of wool stored in a barn.

Eggs of the cactus moth (*Cactoblastis cactorum*) were introduced from Queensland in March, 1934, by a resident near Adelaide, and placed on a small localised area of *Opuntia monacantha*. In July there was evidence of the working of the larvae, several of which were found.

Larvae of the moths *Eucosma triangulana* Meyrick and *Orgyia anartoides* Walk. were taken feeding on seedlings of *Pinus radiata* in Mount Gambier district.

Larvae of the tortrix moth (*Tortrix divulsana* Walk. = *gratirana* Meyrick) caused damage to seedlings of *Pinus radiata* in the same district. The seedlings were about a foot high; the caterpillars bind together the needles of the terminal shoot, line the chamber with silk, and pupate there; affected seedlings are recognised by the bunched appearance of the growing tip; this destroys the leader of the young tree. Dr. Jefferis Turner kindly identified the moths bred out from affected material.

The Psyllid *Cardiaspis brunneus* Frogg. was found heavily infesting leaves of red gum (*E. rostrata*) in the South-East; the leaves of affected trees were discoloured and dry. The Cercopid *Bathylus albicincta* Erichson was present in large numbers on *Acacia* sp. at Penola in January, 1933.

The March flies *Tabanus bassi* Ferguson and *T. petasta* Walk. occur commonly in certain coastal districts in the South-East.

The cattle louse (*Linognathus vituli* L.) was taken from calves near Adelaide. The animals were heavily infested and in poor condition.

The "ti-tree itch mite," which is a larval form of *Trombicula hirsti* Sambon, occurs commonly in districts around Robe; the mites cause skin irritation where they pierce the skin. An important paper on the Trombid and Erythraeid mites of Australia, by H. Womersley, has been published recently (*Records S. Aust. Mus.* 5, No. 2, 1934).

The bulb mite (*Rhizoglyphus echinopus* F. and R.) was found infesting a consignment of imported bulbs. This mite commonly occurs on bulbs in Adelaide hills district.

The springtail (*Hypogastrura armata* Nic.) occurred in pest numbers in beds of cultivated mushrooms near Adelaide. The species *Onychyurus fimetarius* L. often occurs in large numbers in damp situations in decaying garden vegetable matter and damp humus soils. The insects were stated to be damaging strawberry plants near Murray Bridge in November, 1933. Many species of springtails are of considerable economic importance. H. Womersley has contributed important papers on the Australian forms (*C.S.I.R. Aust.*, Pamph. 34, 1932; *Trans. Roy. Soc. S. Aust.* 57, 48-71, 1933; 58, 86-138, 1934; *Stylops* 2, 241-247, 1933).

VETERINARY LODGES.

[In our February issue reference was made under "Veterinary Instructors" to the establishment of Veterinary Lodges. Through the courtesy of the Balaklava Veterinary Lodge, the appended rules are published for the information of Branches of the Agricultural Bureau or other organisations contemplating the formation of Lodges in other districts.]

1. The name of the lodge shall be "Balaklava Veterinary Lodge."

2. The object of the lodge is to provide a veterinary surgeon for the benefit of its members, to attend to their respective horses and cattle, perform operations, excepting castration, and attend to all illnesses whatsoever.

3. The rates of subscription shall be as follows:—Within a radius of 5 miles of Balaklava Post Office—from 1 to 5 head, £1 1s. per annum; from 5 to 10 head, £2 2s. per annum. Over 5 miles and up to 20 miles from post office the rate will be £3 3s. up to 30 head of stock. These rates to include horses and cattle the *bona-fide* property of a member. All over 30 head to be charged for at the rate of 6d. per head per annum. Mileage each way, 3d. per mile extra.

4. All subscriptions shall be due and payable on or before the 30th of April in each year. Any member whose subscription shall remain unpaid by that date may be suspended by the committee until such subscription is paid, and in the interim shall not be entitled to any benefits accruing under these rules.

5. The management shall be vested in a committee of eleven members (who shall elect a chairman from their number). The committee elected shall retire annually, but shall be eligible for re-election.

6. The committee shall meet as required by chairman and secretary. Five to form a quorum.

7. The committee shall cause to be kept fair and accurate minutes of its proceedings, including statements of all receipts and payments, and the minutes of each meeting shall be read and confirmed at the meeting following.

8. The committee shall lay before the annual meeting a report and statement of all receipts and expenditure during the year.

9. The secretary shall attend all committee and general meetings, and keep accurate minutes thereof, and conduct the correspondence of the lodge. He shall pay all moneys received by him into the lodge banking account as soon as the same shall amount to £10.

10. One auditor shall be appointed at the annual meeting for the ensuing year. He shall, prior to the annual meeting, examine all books and vouchers, and certify as to the correctness or otherwise of the balance-sheet.

11. The annual meeting of the said members of the lodge shall be held during the month of March each year, when the committee shall present their report and balance-sheet, and election of officers (if necessary) and any other business may be brought forward.

12. The veterinary surgeon shall enter into an agreement to serve the lodge, and three months' notice must be given by either side before same can be terminated.

13. Fourteen days' notice shall be given to each member for all general meetings, 12 to constitute a quorum. If, at the expiration of one hour from the time appointed for holding such meeting there shall be no quorum present, the meeting

shall lapse, and the committee shall convene a special general meeting to be held within 30 days of the date first fixed.

14. A special general meeting may be convened by the committee, or by petition to the committee, signed by any 12 members of the lodge, notice thereof being given in the same way for the annual meeting, such notice also to state the business for which such meeting is being called. No other business than that set forth on the notice paper shall be taken into consideration at any special meeting. Any vacancy may be filled at such meeting called for the purpose.

15. Any person residing outside the radius of the lodge may become a member of such lodge on payment of subscription, as provided by rule 3, over 20 miles, mileage 1s. per mile, but the committee shall have power to refuse any person membership without assigning any reason for so doing.

16. The veterinary surgeon shall be entitled to attend private cases, so long as same do not interfere with the attendance upon members.

17. Should the veterinary surgeon be at one member's place, and another member call for him, it will be the duty of the veterinary surgeon to attend as soon as possible.

18. Medicines required shall be supplied by the veterinary surgeon at cost price, and shall be paid for within one month of purchase.

19. Should a member have horses or cattle requiring frequent treatment he may take same to the veterinary surgeon's residence, who shall attend to same there; but the member must pay all cost of feed and stabling, etc.

20. Should the veterinary surgeon leave the district for either business, holiday or illness, he should, if possible, supply a substitute in equal ability to himself, but the committee may grant him three days' leave of absence without so doing.

21. All salaries, accounts, &c., over £1 shall be paid by cheque, duly signed by one member of the committee and secretary.

22. Any member or the veterinary surgeon of this lodge coming within these rules may be held thereby to consent to be bound by them, and shall not be entitled to appeal to any court by reason of anything done under these provisions.

23. The committee of this lodge shall be indemnified from the funds of same against the cost of any legal proceedings that may be instituted against them in consequence of the performance of their duties.

PAPERS READ AT CONFERENCES.

YORKE PENINSULA BRANCHES, KADINA, 6th MARCH.

HORSE DIPPING.

[S. PONTIFEX, Paskeville.]

Whilst the word dipping may be somewhat anomalous as applied to horses, it doubless explains the operation sufficiently. It is quite safe to totally immerse sheep—one minute being considered the correct time for a swim through the dip, on account of the wool retaining a fair amount of the fluid; but horses require 20 minutes, and if the dip is deep enough to cover the animal, serious complications may arise. Also the dip is very expensive to construct.

I speak with first-hand knowledge of this subject. Our horse dip has been in operation at Paskeville for some time, and since its inception my horses have not missed their annual bath.

I advocate Cooper's Milk Oil Fluid, procurable in 5gall. drums, and if the directions on the tin are correctly carried out, good results are obtained. The advantages of dipping horses annually should be obvious to all. No great time ago it was quite uncommon to see horses rubbing against any available structure; but since skin parasites have spread throughout the country, stall rails are pushed down, mangers knocked over and polluted, and post and rail fences around the stables are almost impossible to keep in repair. Dip once a year as a preventive, rather than wait until the horses get very badly affected, when it would require two dippings at intervals of two or three weeks to be effective. Once the team is free from lice, a marked difference will be noticed. Horses appear and do much better. The tuft of hair so much admired on the legs of a Clydesdale will grow to its normal size and shape. After feeding, the horses rest quietly, instead of continually stamping their feet and rubbing, some continuing until the legs are quite raw. Dipping obviates the necessity for continually mending the fence of the horse paddock; when horses are shut in a paddock devoid of timber, the fences suffer to a great extent.

If the fluid is deep enough to cover what is generally known as the chain mark on a horse, that appears to be quite an effective depth. Having to construct the dip of stone or concrete underground, it will be readily understood that the fluid is mostly very cold; but at this depth no ill effects have been known. It is a warm weather job, and then the horses dry quickly after the dip has been bucketed up and the body of the horse thoroughly washed, the mane and tail in particular. It is not a good practice to dip horses in an overheated state; they should have time to cool down before entering, and should be kept steadily under control until reaching home.

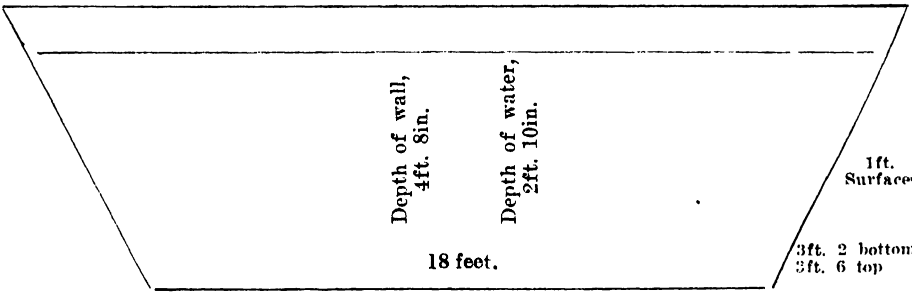
Our dip is long enough to take four horses at a time, and as the legs are always most affected, the fourth horse stands up to his knees in the shallow entrance, likewise the first horse in the sloping outlet, and the two middle ones in the deepest part.

With sufficient help, 12 horses an hour can be put through, and each horse is given its prescribed time. The inlet and outlet have corrugations in the concrete, and should be a gentle slope to minimise slipping, because when valuable horses are going through, reasonable care should be taken. All stock are dipped at owner's risk and a notice to that effect should be exhibited. Some people consider it a dangerous operation; but the horses take it kindly enough, especially if there is more than one horse in the dip at a time.

To facilitate entering, they are blindfolded with a piece of old canvas or some dark material that they cannot see through, being pushed up under the noseband and forehead band of the winkers; once in the dip, this is better removed.

[*Papers Read at Conferences.*]

All farmers are advised to keep their horses in a clean and healthy condition by dipping them in a reliable compound for that purpose at least once a year.



This dip could be improved by making it 9in. to 1ft. deeper. At present it is not quite deep enough.

There can be five or six draught horses standing in the dip at once; when a horse has been washed all over in the deep part of the dip, move him on up the slope, because the legs are the worst trouble. The time for dipping is from October to April, or just before hay harvest and as soon as the harvest is over. Keep the horses in the dip from 15 to 20 minutes, and if very bad, dip again on the ninth day. Use Cooper's Liquid Dip, 1 gall. of dip to every 120galls. of water.

When the Paskeville dip was built in 1932 164 horses were dipped, in 1933-34 159, and so far this season 58.

PIG RAISING.

[S. CHYNOWETH, Boor's Plains.]

The two essentials for success in pig farming are breeding and feeding. The pigs must be of even type and correct shape, and they must be given such food as will make them capable of producing the kind of bacon that the consumer desires. The breeding of pigs of the type in demand is the most important factor, and means the difference between profit and loss. At present the buyer of bacon pigs is looking for a pig with a long, deep middle, light shoulders, and good hams, first in importance being the middle. The hair and skin give a fair indication of the firmness and quality of the flesh. The pig with coarse hair and wrinkly skin will probably yield coarse, dark flesh. Hairless skin usually denotes too much lard. A pig should show fine bone, coarse bone indicates coarseness throughout. An animal with heavy, thick shoulders should be avoided. The shoulder must be fine, joining on to the side smoothly, and must be free from lumpiness. The top line should run smoothly from ears to tail, with a slight arch; the side deep, with a level underline, thick at flank. The pig should not taper from shoulders to hams. It should be as wide as and preferably wider there than at the shoulder. White pigs are preferred.

The breed recognised all over the world as the best bacon producer is the Large White. The fact that the Large White has been accepted as the ideal bacon pig does not mean that all Large Whites are good. Careful and continued culling and selection are needed, and the culling should be drastic. Those showing short bodies, signs of wrinkly skin, coarse heavy bone, coarse hair, heavy shoulders, and heavy jowls should be culled. There are two methods of keeping pigs—in the sty and in the open air. For the past decade the Department of Agriculture has advocated the latter method. Running pigs on pasture has proved more economical than keeping them in sties. Not only is there a saving in labour, the pigs are healthier, and less subject to infestation by worms, and there are fewer losses after farrowing.

[*Papers Read at Conferences.*]

In sties—and especially dirty sties—there are losses, frequently from 20 to 50 per cent. of the young pigs die after farrowing, and a considerable percentage after weaning.

In trials carried out over a period of years, the average litter per sow with open air methods was over 9, and the average number reared was over 8, the loss being approximately 1 per cent., and the percentage of loss after weaning less than 1 per cent. For the open air method of keeping pigs it is necessary to have proper paddocks. A convenient size for the farrowing shelters, which can be made of wood and iron, is the roof type, 8ft. x 8ft. x 5ft. high; a floor is unnecessary except under very wet conditions. Two rails are placed 3ft. apart and 9in. from the ground, to prevent the young pigs from being crushed. The shelter is open in front, but as a sow always turns her head to the open when farrowing, the young ones are born under shelter. These structures can be moved readily by two men. Shelters in the fattening paddocks should be about 12ft. x 6ft. x 4ft. at the back and 5ft. in front. The use of automatic feeders is recommended; there is a decided saving of labour, while the pushing and jostling that occur at the troughs, with a consequent waste of feed, are reduced to a minimum. Again, if pigs can feed whenever they wish, they eat slowly, the food is more thoroughly digested than is the case when it is bolted, and the weak pigs get as much as the stronger ones.

Shelter sheds for the dry sows should be the same as in the fattening pens, and the paddocks should be provided with water troughs, amply shaded.

After being served, the sows remain in the paddock adjoining the boar paddock for three weeks; if in pig, they are moved to the larger paddocks reserved for dry sows. If the pasture in these paddocks is good, very little grain feeding will be required until within a month of farrowing, when they are shifted into the paddock for forward sows. A week before farrowing they are brought into the farrowing paddocks.

In both these paddocks the sows are fed a balanced ration, consisting of crushed grain and a little meat meal. The amount of feed will depend on the condition of the sows. Breeding sows should not be fat, neither should they be in low condition. If run on pasture they will remain in good store condition and keep healthy. The sows remain in the farrowing paddocks for eight weeks after farrowing. During this time the sow requires an average of 1lb. of grain mixture for each pig in the litter, plus an extra 3lbs.; thus a sow with a litter of 10 pigs would require 13lbs. of grain mixture per day. When three weeks old, the young pigs should be provided with a feeding trough in a creep and fed a mixture of gristed grain and 12 per cent. meat meal. At eight weeks—when the young pigs are ready for weaning—the sow and litter are moved to the fattening paddocks, the sows being removed two days later to the paddock adjoining that of the boars to await service.

All little pigs should be "wormed" as soon as they are weaned. There are several methods of getting rid of worms, but I recommend Nema worm capsules, as they kill round worms, hook worms, and stomach worms. They are easily administered by using the capsule forceps and mouth spreader. While in the fattening paddock, any short, dumpy pigs should be culled and sold as porkers, for they will not be saleable as baconers.

Each sow should be earmarked for identification purposes, and a record kept of her progeny. The useful life of a sow extends to six years, and usually after that age it is advisable to dispose of her as a "back-fatter."

FEEDING.

Skim milk and buttermilk are of equal feeding value. Care should always be taken to see that the buttermilk has not been adulterated by water used in washing the butter; drainage from the testing room must be especially avoided. There is a belief prevalent among some farmers that if milk is to produce the best bacon it should

be allowed to sour and thicken before being fed. There is no ground for this belief, and one reason why it should not be acted upon is that milk which has been put in dirty casks to thicken may cause the death of young pigs. Sweet milk is safer and produces first-class pork and bacon when fed with grain. In feeding milk to get the best results, sufficient grain should be added to provide the carbo-hydrates required to balance the ration.

Where feed is fed in a trough, the grain—which should be crushed—should be added to the skim milk at the following rates:—

For young pigs in creep—

At 1 month—2lbs. grain to 1gall. milk.
At 6 weeks—2½lbs. grain to 1gall. milk.
At 8 weeks—3lbs. grain to 1gall. milk.
At 10 weeks—3½lbs. grain to 1gall. milk.
At 12 weeks—4lbs. grain to 1gall. milk.
At 14 weeks—4½lbs. grain to 1gall. milk.
At 16 weeks—5lbs. grain to 1gall. milk.

The broadening of the ration as the pig gets older means a greater supply of carbohydrates. Where the automatic feeder is in use the pig should get a drink of milk twice daily; in addition, there should always be clean drinking water available.

Barley comes first among the grains as a food for producing first-class pork or bacon, and in conjunction with skim milk, forms an ideal food. Oats, on account of the large percentage of hull, which is indigestible by the pig, are not advised for pigs under the age of 12 weeks. They, however, produce good bacon or pork. Wheat as a food gives fair results. Feeding trials carried out with wheat and barley mixed and wheat alone showed that pigs made quicker gains on wheat and barley. When killed and dressed and allowed to set, the pigs fed on the wheat and barley mixture showed a firmer fat than did those fed on wheat alone.

Pollard is perhaps the byproduct most used by pig farmers, being so finely ground it is especially suitable for young pigs; but when a pig is fattened on pollard alone, the flesh is soft, therefore other grain should be introduced and fed in conjunction. Suitable quantities are set out hereunder:—

At 10 weeks—7 parts pollard, 3 parts barley.
At 12 weeks—6 parts pollard, 4 parts barley.
At 14 weeks—5 parts pollard, 5 parts barley.
At 16 weeks—4 parts pollard, 6 parts barley.

Bran is usually fed as a laxative, not as a fattening food, and is given to brood sows a few days before and after farrowing, to prevent constipation. From 1lb. to 2lbs. daily will be sufficient.

Meat meal is a protein rich food, containing from 50 to 60 per cent. of that constituent, and is used when no milk is available to add to grains to balance the ration, and may be fed in the following quantities according to the age of the pig:—

For young pigs in creep—12lbs. meat meal to 100lbs. grain.
At 8 weeks—10lbs. meat meal to 100lbs. grain.
At 12 weeks—8lbs. meat meal to 100lbs. grain.
At 16 weeks—6lbs. meat meal to 100lbs. grain.

And finish off at this amount.

Pigs are quick-growing animals with a comparatively small stomach capacity, consequently those kept in sties and fed in troughs should be given at least three feeds daily. When fed only twice, they become exceedingly hungry and may perhaps gorge themselves; diarrhoea aften follows, sometimes with fatal results. Pigs must not be allowed to become ravenous. They should be given at each feeding as much as they will eat in half an hour. Keep plenty of clean drinking water before the pigs at all times.

[*Papers Read at Conferences.*]

Where sows are kept in sties, they should never be fed on grain and water only. If milk or pasture is not available, meat meal fed at the rate of 6 parts to 100 of grain, or bone flour 1 part to 100 of grain, will suffice. Open-air farrowing is preferred, where possible; this will necesitate the use of movable farrowing shelters in small paddocks.

Little pigs should be kept out in the light and open air as soon as possible. They will look for roughage when about three weeks old, and a creep should be provided for them. Young pigs should not be allowed to become ''staggy''. To guard against this, castrate them at a month old. If possible, fatten in small lots, never more than *20 pigs together;* when kept in large mobs they require a longer time to fatten.

Never place sties or sleeping quarters in gullies or on the side of banks where there may be draughts; always provide a shelter which will shield them from the wind, cold, and rain. Shade in summer is essential; a wallow will give good results. It need not be very deep—about 16in. will suffice, and it should contain 9in. or 10in. of water. It should be protected from the sun by a roof—one of straw will do. A small quantity of crude oil may be added with advantage to the water.

The most economical way of supplying mineral matter is by charcoal and ashes. The animals may be kept free from vermin by using crude oil. When a pig attains the weight required by the curer, and is in good condition, it should be marketed, even though the market is dull. It is a mistake to wait for prices to rise; a pig may lessen in value, for there is no sale for overfat bacon. The sow should earn as much as the cow on the farm.

There are possibilities for the pig industry in South Australia, but those possibilities will not be attained until a policy of grading pigs and grading bacon is adopted. Payment according to the grade of a pig will ensure the farmer receiving the highest price for animals of the best quality, while the grading and marketing of bacon will ensure consumers getting exactly the sort of bacon they desire. The boar should have plenty of exercise and be fed well, but not too fat. I prefer feeding barley or oats in the morning and a sheaf of wheaten hay at night.

METHODS OF SEED SELECTION RECOMMENDED FOR THE IMPROVEMENT OF WHEAT VARIETIES.

[L. Mc. Carter, Boor's Plains.]

This paper is written with a desire to bring before the notice of wheatgrowers the necessity of encouraging them in the growth of improved strains of varieties, that they may in time become sufficiently interested to take part in this business themselves. Much of the higher experimental work of the Agricultural Department's officers will then appeal to and interest them, and its importance will encourage them to support and encourage scientific investigation generally. However modest the farmer's original work of seed improvement, a good purpose is served, and it inevitably acts as a lever to raise agriculturists to a still higher plane, both socially and politically, and is an important economic factor in the Commonwealth's progress.

The creation of new varieties of wheat is of absorbing interest to the majority of farmers, though as a rule, they have no conception of the rigorous tests each seedling wheat has to pass through before it reaches their farms. So few new crosses measure up to the standards required of a new variety, that unless a farmer has a special inclination for this work, without interfering with his business, he should leave it alone and confine his undivided attention to the improvement of standard varieties by selection. This is a work all farmers should give every consideration.

The principal methods adopted for improving the quality and yielding power of a variety by selection are—

(1) Pedigree selection.
(2) Mass selection.

[*Papers Read at Conferences.*]

PEDIGREE SELECTION.

In pedigree selection individual plants of a variety are dealt with and consideration given to their yields and prepotent qualities through a season of growth until harvested. After harvesting the grain is tested for flour strength.

Naturally the first consideration that enters the mind of the seed farmer is to choose for his operations promising yielding varieties having other desirable qualities, such as practical harvesting properties. As a nucleus from which to select, a farmer should always purchase a quantity of pedigree grain from a reliable grower.

Just as the development of fine breeds of livestock is due to the keen perception of the stud breeders when selecting right types of animals to breed from and eliminating the less desirable, so will keen perception and selection account for the development of productive strains of high quality wheats. The environal conditions would influence the selector in this choice of selecting strains of a variety. Rust resistance, early maturity, a less shattering proclivity of the grain in the ear, a higher gluten content, a stronger flourmaking grain, greater drought resistance, and such qualities give a wide field for enthusiastic activities, since all bear on that important essential, the production of a profitable commercial wheat.

For pedigree selection, the grains of picked plants are sown singly in well prepared soil, from 6in. to 8in. apart in the rows, in order that the characters of every individual plant may be studied. At harvest time what are considered the most typical plants, perhaps a dozen, are selected and kept separate. Equal quantities of grain from each selected plant are then sown in separate rows, preferably as single seed plots, in order to better estimate the trueness in characters of the individual plants and to discard the strains showing imperfections.

The average farmer will not have the time at his disposal, nor the inclination, to enter deeply into pedigree breeding, unless it is his intention to make the production of pure pedigree seed for sale his primary object. Every wheatgrower, however, should be interested in improving wheat varieties by mass selection and thorough grading of the seed.

Owing to the seed being drilled in, and possibly several seeds germinating at the same spot, it is impossible for the farmer to select the best plants. For this reason he must depend on the selection of the best typical ears. To do this he must fix in his mind the type of ear he intends to establish, and select through years to it, otherwise he would never arrive. Naturally the most prolific ears will be those with the greatest number of spikelets, containing from three to five grains across—that is, three to five grains to the spikelet. An average of 12 rows of spikelets on either side of the rachis will prove sufficient.

To minimise errors due to possible soil variations, a narrow rectangular plot is more desirable than any other, and the long side should be at right angles to the furrows of the previous working.

The average farmer is most likely to content himself with one plot, the longer the better; but it should be not less than one-fiftieth of an acre in area, and this would require approximately several pounds of seed for an even drilling. A plot 124½ft. by 7ft., sown with an ordinary 12ft. drill, would serve for all practical purposes, being approximately one-fiftieth of an acre. Where several plots are undertaken, they should be spaced widely enough to allow of proper harvesting.

MASS SELECTION.

Mass selection relies on the selection of the best ears of the crop, threshing them together, and by a process of continuous mass selection to arrive at a similar end to pedigree selection. Before sowing, the seed of the selected ears should be thoroughly hand picked.

Each season the process of mass selection should be continued to keep the strain pure and to improve its other good qualities.

[*Papers Read at Conferences.*]

A spirit of mutual help should be fostered in each district by the Agricultural Societies, so that a common interest may be created in producing the best strains of particular varieties most suitable for a particular district.

It must be understood that the process of mass selection does not induce new characters in a variety; it simply develops the inherent qualities, and conditions are made available to bring out what is best in them. It is owing to these fluctuating variations in a variety that seed selecton is so desirable and necessary to develop a strain suiting the environal conditions of each particular district.

Change of seed is rarely necessary if soil and environal conditions are favourable to the variety and seed selection is practised.

It should not be thought that seed selection is a substitute for cultivation, so that where the best results are expected, seed selection as well as thorough cultivation and good management generally should be practised. It has been proved in a number of cases that where the same varieties have been grown from 20 to 25 years without change of seed, that they are to-day better than the originals. Unless seed selection is practised, it will be found that many of the plants in time exhibit loss of stamina, which is also reflected in their liabilities to the attacks of disease and physiological irregularities.

THE VALUE OF READING TO THE MAN ON THE LAND.

[H. QUEALE, Boor's Plains Branch.]

Reading ranks with travel and intercourse with one's fellow men as a means of acquiring knowledge, and for the rank of file of farmers is the most accessible. The average farmer is blessed with a fair amount of commonsense, and has his own ideas about matters pertaining to his daily life. Left unexpressed, they are of small account. But passed on to his fellow men, the ideas become vitalised and of greater importance. Even the wrong idea is best expressed, because one is given the chance to help and correct his fellow man. Of infinitely greater importance is the good idea when it is passed on.

Many men cannot always evolve an expression from a thought. He is not good at telling the other fellow, with any marked degree of lucidity, what he has in mind. This applies in a peculiar manner to the man on the land, because he lives, to a point, unto himself. Resulting from this quasi-lone life is an embarrassment at hearing his own voice, with the consequent difficulty of expression. Herein lies the value of reading. The man who reads and takes notice of what he reads, unconsciously absorbs words, terms, phrases, and paraphrases, and modes of expression. These are stored away in his subconscious mind, and at the most unexpected times, very often, these expressions flash across his mind and help him out of a difficulty. He acquires an ease of manner and a freedom of speech from his reading which, without travel and intercourse, would be denied him. With a little reference to a good dictionary he will also acquire correct pronunciation and enunciation of the language of the day.

In his daily life he has the practical experience of his work, and if he couples this with studying suitable books he is undoubtedly the gainer. The bogey word "theory" would certainly lose a vast amount of valueless meaning to the conservative-thinking farmer, and he may become a Bureau member and a reader of the *Journal of Agriculture,* the value of which is very great.

To accumulate knowledge and obtain ideas of current topics the constant use of the daily paper is unsurpassed. Reading widens one's outlook and extends the vision to realms of thought and feeling otherwise unattainable. Australia, by reason of its great distance from other countries, is apt to foster ideas of insularity. Although and aerial progress have minimised distance, the man on the land, by his still labours under many disadvantages. Travel is too expensive to be in- extensively.

[*Papers Read at Conferences.*]

The desire for and value of co-operative thought and action have been evidenced times without number. The danger of thinking and acting alone threatens to become political retrogression and industrial stagnation. The value of reading to the man on the land cannot be too greatly stressed. For, as he reads, so he thinks; and as he thinks, so does he act. The value of acting upon the result of co-operative thought brings it own reward.

As a pleasure and a hobby, the book lover finds nothing so entrancing or enchanting as a good book. R. L. Stevenson's lines, "What are my books? My friends, my church, my tavern, and my only wealth," readily come to one's mind. To-day the value of recreation to the man on the land has a definite place. It is a time of serious thought and grim struggle. Unless he spends his leisure hours—few enough though they be—in pleasant ways, his mind will not be refreshed when he again takes up his daily duties.

The choice of literature is of very great importance. There are many dangers as well as benefits to be had from reading. It is well worth a man's while studying carefully the works of the day, before accepting all and sundry alike, and when Australia has a better informed farmer, who has the ability to put his "case," then, and then only, will she have a rural population who can defend the man on the land and lend a dignity to his calling.

Reading is one of the surest, safest, and most accessible means of acquiring a sense of expression, a knowledge of matters requiring understanding, and a real and lasting pleasure to the man on the land.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held at the Blackwood Experimental Orchard on 27th February, there being present Messrs. A. J. Cooke (Chairman), H. N. Wicks, P. J. Baily, R. H. Martin, S. Shepherd, F. Coleman, A. J. A. Koch, A. G. Strickland (Deputy Chief Horticultural Instructor), R. Fowler (Manager Blackwood Orchard), and H. C. Pritchard (Secretary). Apologies were received from Professor A. J. Perkins, Dr. A. E. V. Richardson, Messrs. J. B. Murdoch, J. W. Sandford, and A. M. Dawkins.

Leave of Absence.—The Secretary reported that the Minister had approved of five months leave of absence for Mr. Jeffrey.

Life Members.—Messrs. H. G. Pym and R. S. Talbot, of the Blackheath Branch, were approved as Life Members of the Agricultural Bureau.

New Branch.—Approval was given for the formation of a Branch of the Agricultural Bureau at Maltee (Women's), with the following as foundation members:—Mesdames L. M. Martin, J. Bassham, C. Ferguson, H. J. and C. T. Schwarz, A. Edson, and S. Bawden, Misses L. and A. Bassham, L. Ferguson, L. and S. Schwarz.

New Members.—The following names were added to the rolls of existing Branches:—Balhannah—B. E. Nitschke, T. E. Edwards, G. T. Edwards; Balhannah Women's—Mrs. F. Leane; Block E—C. F. Sowden; Boor's Plains Women's—Miss L. Lamshed; Coonalpyn—E. Fox, J. Fox, Charles C. George, C. L. George, P. Haydon, J. Haydon, R. V. Potter, C. Todd, sen., Cyril Todd, Charles Todd, jun., S. Todd, F. Todd; Kybybolite—A. W. Feuerheerdt, H. S. Naylor, H. G. Spencer; Maltee—N. D. McConchy; Mount Compass—L. W. Weinert; Mount Gambier—Harold Clark, Ralph Clark; Mundalla—Ivan Dinning; Myponga—J. A. Schmeiss; Pinnaroo Women's—Miss Ruth Pearce; Renmark—H. Vorweck, F. Hunt; Tweedvale—P. Kerber, V. Gurr, W. Erdmann, C. Pfeiffer; Wilmington—L. F. Modystach; Wirrilla Women's—Mrs. H. V. Kirk.

Present No. of members, 6,818; present No. of Branches, 339.

Sulphate of Ammonia.—At the January meeting the MacGillivray Branch asked the Board to endeavour to have the tariff reduced on sulphate of ammonia. The rates of duty are:—British preferential (free), general (22½ *ad valorem*). For each £1 by which the equivalent in Australian currency of £100 sterling is less than £125 at date of exportation, an additional duty of .6 per cent. *ad valorem*. It is exempt from Commonwealth primage duty and sales tax. The Secretary was instructed to advise the Branch of the rates of duty.

Records of the Blackwood Orchard.—The Secretary reported that Mr. Quinn had supplied portion of his report and the copy was in the hands of the Government Printer for publication. Members expressed appreciation of the fact that this work was at last being undertaken.

Veterinary Instructors.—The Secretary reported that in accordance with the Board's instructions, the correspondence relating to this question was circulated among Branches and replies have been received from Koolunga and Penola appreciating the Board's part in endeavouring to secure instructors for country districts.

General items were taken in committee.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	209	
	2	203	
	3	29	441
	4	—	
	5	191	
	6	145	336
			777
A. H. Matthews, Bridgewater	7	150	
	8	157	
	9	144	451
	10	190	
	11	dead	
	12	45	235
			686
G. W. T. Symes, Echunga	13	182	
	14	28	
	15	198	408
	16	98	
	17	150	
	18	186	434
			842
E. B. Gliddon, Yundi	19	185	
	20	109	
	21	dead	294
	22	dead	
	23	81	
	24	78	159
			453
T. Cleaver, Bridgewater	25	164	
	26	108	
	27	dead	272
	28	100	
	29	dead	
	30	166	266
			538
J. E. Assender, Echunga	31	144	
	32	161	
	33	148	453
	34	84	
	35	122	
	36	189	395
			848
[illegible]. Hill, Bridgewater	37	193	
	38	90	
	39	258	541
	40	168	
	41	dead	
	42	147	315
			856
[illegible]. R[illegible]ll, Echunga	43	199	
	44	219	
	45	dead	418
	46	159	
	47	146	
	48	163	468
			886

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
C. Guthridge, Yundi	49	180	
	50	207	
	51	176	563
	52	28	
	53	72	
	54	124	224
			787
S. Lambert, Echunga	55	183	
	56	28	
	57	dead	211
	58	44	
	59	141	
	60	137	322
			533
A. Young, Bridgewater	61	100	
	62	207	
	63	159	466
	64	199	
	65	178	
	66	197	574
			1,040
D. J. Foxwell, Echunga	67	184	
	68	173	
	69	117	474
	70	153	
	71	127	
	72	45	325
			799
J. C. Normandale, Yundi	73	154	
	74	201	
	75	180	535
	76	150	
	77	144	
	78	161	455
			990
L. W. Sando, Echunga	79	185	
	80	dead	
	81	149	334
	82	203	
	83	198	
	84	159	560
			894
J. O. Marshall, Yundi	85	204	
	86	237	
	87	52	493
	88	dead	
	89	177	
	90	168	345
			838
Murray Powell, Jupiter Creek	91	99	
	92	186	
	93	186	471
	94	dead	
	95	207	
	96	69	276
			747

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
S. Bridge, Yundi	97	175	
	98	163	
	99	155	493
	100	138	
	101	dead	
	102	191	329
			822
C. T. Rodger, Echunga	103	97	
	104	145	
	105	172	414
	106	192	
	107	189	
	108	dead	381
			795
R. H. Smith, Yundi	109	46	
	110	27	
	111	220	293
	112	31	
	113	138	
	114	66	235
			528
Willow Bend Stud Poultry Farm, North Walkerville	115	56	
	116	111	
	117	174	341
	118	—	
	119	78	
	120	158	236
			577
C. MacDonald, Echunga	121	28	
	122	123	
	123	191	342
	124	181	
	125	152	
	126	108	441
			783
T. R. Smart Yundi	127	217	
	128	128	
	129	dead	345
	130	124	
	131	dead	
	132	162	286
			631
Raymoor Poultry Farm, William Street, Kilkenny	133	80	
	134	172	
	135	176	428
	136	162	
	137	129	
	138	dead	291
			719
B. R. Whittington, Yundi	139	104	
	140	153	
	141	246	503
	142	138	
	143	93	
	144	190	421
			924
W. [illegible]seal, 11, [illegible] Street, Rosewater	145	7	
	146	228	
	147	154	389
	148	dead	
	149	162	
	150	dead	162
			551
H. F. Muirson, Yundi	151	56	
	152	100	
	153	82	238
	154	70	
	155	133	
	156	139	342
			580
K. Pennack, Pooraka	157	3	
	158	160	
	159	123	286
	160	199	
	161	92	
	162	185	476
			762
C. A. L. Sandstrom, Yundi	163	117	
	164	159	
	165	182	458
	166	214	
	167	154	
	168	58	426
			884
G. A. Bielby, Pooraka	169	71	
	170	100	
	171	91	262
	172	168	
	173	dead	
	174	dead	168
			430
W. M. Field, Yundi	175	154	
	176	148	
	177	181	483
	178	71	
	179	153	
	180	153	377
			860
T. Duhring, Mallala	181	211	
	182	229	
	183	165	605
	184	175	
	185	114	
	186	101	390
			995
W. R. Hedger, Yundi	187	191	
	188	dead	
	189	84	275
	190	103	
	191	222	
	192	dead	325
			600
A. & H. Gurr, Bradbury	193	178	
	194	197	
	195	122	497
	196	202	
	197	206	
	198	204	612
			1,109
J. V. McGinnis, Yundi	199	202	
	200	90	
	201	144	436
	202	134	
	203	164	
	204	22	320
			756

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	213	
	206	176	
	207	214	603
	208	127	
	209	146	
	210	199	472
			1,075
W. C. Jones, Yundi	211	10	
	212	121	
	213	214	345
	214	118	
	215	179	
	216	74	371
			716
Langmaid & Bettison, Parafield, Salisbury	217	dead	
	218	133	
	219	78	211
	220	139	
	221	152	
	222	164	455
			666
A Jarvis, Yundi	223	78	
	224	143	
	225	86	307
	226	158	
	227	139	
	228	206	503
			810
S. Eyles, Clarendon	229	79	
	230	dead	
	231	164	243
	232	153	
	233	210	
	234	160	523
			766
Woodbury Poultry Farm, Stirling East	235	124	
	236	17	
	237	183	324
	238	dead	
	239	66	
	240	109	175
			499
V. F. Gameau, Findon Road, Woodville	241	78	
	242	6	
	243	139	223
	244	dead	
	245	96	
	246	138	234
			457
Geo. Lomax, Yundi	247	150	
	248	39	
	249	154	343
	250	dead	
	251	dead	
	252	69	69
			412
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	169	
	254	223	
	255	66	458
	256	21	
	257	12	
	258	29	62
			520

Competitor.	Bird No	First Grade Eggs Progressive Totals to March 9th, 1935.	
W. R. Williams, 28, Avenue Road, Frewville	259	235	
	260	88	
	261	dead	323
	262	150	
	263	222	
	264	218	590
			913
R W. McAllister, Yundi	265	86	
	266	126	
	267	180	392
	268	108	
	269	203	
	270	132	443
			835
G. W. Sykes, Yundi	271	73	
	272	dead	
	273	139	212
	274	200	
	275	190	
	276	140	530
			742
A P. Urlwin, Balaklava	277	214	
	278	181	
	279	194	
		589	
A. V. Dupen, Melton Street, Glenelg	280	199	
	281	224	
	282	135	
		558	
F F. Welford, Ludgate Circus, Colonel Light Gardens	283	104	
	284	211	
	285	166	
		481	
Thomas & Elson, Clifton Street, Hawthorn	286	159	
	287	84	
	288	156	
		399	
J. H. Dowling, Glossop, River Murray	289	130	
	290	201	
	291	189	
		520	
E. Pape, Wynarka	292	dead	
	293	27	
	294	152	
		179	
L. S. Ekers, Mount Jagged Farm Mount Compass	295	175	
	296	148	
	297	174	
		497	
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	200	
	299	201	
	300	212	
		613	
L. R. Badcock, 77, Findon Road, Woodville	301	113	
	302	94	
	303	137	
		344	

Egg-Laying Competition—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	129	
	305	192	
	306	220	
		541	
Gallagher & Aslin, Pooraka	307	183	
	308	184	
	309	168	
		535	
R. C. Crittenden, William Street, Kilkenny North	310	205	
	311	177	
	312	81	
		463	
C. H. Lines, Junr., Gladstone	313	155	
	314	195	
	315	198	
		548	
A. J. Monkhouse Woodside	316	193	
	317	109	
	318	68	
		370	
B Cooke, Kanmantoo	319	216	
	320	235	
	321	217	
		668	
Total Class 1. . . .		41,536	

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
M. O. & C A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	81	
	323	5	
	324	94	
		180	
G. Frisby Smith, Fulham (Minorcas)	325	—	
	326	dead	
	327	159	
		159	
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	106	
	329	197	
	330	153	
		456	
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	83	
	332	205	
	333	144	
		432	
Total Class No. 2		1,227	

Class 3.—*Black Orpington.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	
H. J. Mills, 108, Edward Street Edwardstown	334	207	
	335	95	
	336	198	500
	337	174	
	338	224	
	339	265	663
			1,168
A. G. Dawes, Portrush Road, Glenunga Gardens	340	204	
	341	146	
	342	207	557
	343	172	
	344	147	
	345	171	490
			1,047
Willow Bend Stud Poultry Farm, North Walkerville	346	207	
	347	191	
	348	172	570
	349	177	
	350	82	
	351	110	369
			939
H L Bastin, Southern Cross Poultry Farm, Pooraka	352	156	
	353	152	
	354	167	475
	355	112	
	356	207	
	357	162	481
			956
A C. Byrne, 114, Rose Terrace, Wayville West	358	140	
	359	136	
	360	122	398
	361	150	
	362	202	
	363	129	481
			879
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	135	
	366	129	
		302	
C. H. Lines, jun. Gladstone	367	175	
	368	125	
	369	dead	
		300	
J. H. Dowling, Glossop, River Murray	370	101	
	371	141	
	372	dead	
		242	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	178	
	374	177	
	375	191	
		546	
Mrs. M. Specht, Holder Avenue, Richmond	376	200	
	377	180	
	378	171	
		551	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	120	
	380	181	
	381	94	
		395	
G. Frisby Smith, Fulham House, Fulham	382	156	
	383	33	
	384	115	
		304	
B. Cooke, Kanmantoo	385	213	
	386	187	
	387	179	
		579	
Total Class No. 3.			8,203

Egg-laying Competition—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive to March 9th, 1935.	Totals
Class No. 4.—Any other Heavy Breed.			
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	148	
	389	174	
	390	93	415
	391	167	
	392	119	
	393	180	466
			881
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	153	
	395	196	
	396	222	571
	397	172	
	398	55	
	399	165	392
			963
E. F. Snow, 18, Mt. Barker Road Glen Osmond (Rhode Island Reds.)	400	83	
	401	133	
	402	213	
		429	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	141	
	404	156	
	405	195	
		492	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	71	
	407	180	
	408	176	
		427	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	153	
	410	140	
	411	144	
		437	
K. Pennack, Pooraka (Barnevelders.)	412	187	
	413	168	
	414	198	
		553	
Total Class No. 4.		4,182	
Class No. 5—White Leghorns.			
A. O. Dawkins, Gawler	415	174	
	416	176	
	417	84	434
	418	191	
	419	216	
	420	179	586
			1,020
A. V. Dupen, Melton Street, Glenelg	421	60	
	422	dead	
	423	199	
		259	
A. J. Monkhouse, Woodside	424	205	
	425	163	
	426	199	
		567	
Total Class No. 5.		1,846	

Competitor.	Bird No.	First Grade Eggs. Progressive to March 9th, 1935.	Totals
Class No. 7.—Black Orpingtons.			
A. C. Byrne, 114, Rose Terrace, Wayville West	427	115	
	428	126	
	429	156	397
	430	92	
	431	159	
	432	178	429
			826
G. Frisby Smith, Fulham House, Fulham	433	195	
	434	127	
	435	120	
		442	
Total Class No. 7.		1,268	
Home Project Utility Section.—Wet Mash.			
John Plummer, Virginia School	436	185	
Dudley Harper, Murray Bridge School	437	100	
Jack Beauchamp, Murray Bridge School	438	149	
Jack Beauchamp, Murray Bridge School	439	114	
George Bielby, Abattoirs School	440	dead	
Eric Pratt, Abattoirs School	441	235	
Stanley Pratt, Abattoirs School	442	205	
Mervyn Steer, Sturt School	443	183	
Donald Welford, Westbourne Park School	444	155	
E. Zbierski, Gawler School	445	dead	
J. McInerney, Gawler School	446	85	
F. Martin, Gawler School	447	217	
Darcy Coleman, Mallala School	448	177	
Kevin Angus, Mallala School	449	75	
Alwin Scott, Wellington Road School	450	177	
Jack Dietman, Wellington Road School	451	125	
Milton Smith, Salisbury School	452	189	
Owen Robinson, Ascot Park School	453	163	
Paul Mundy, Urrbrae High School	454	124	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.
Max Couche, Thebarton School	455	210
Robert Swift, Murray Bridge School	456	dead
Bruce Dooland, Thebarton Central School	457	dead
Ian Slee, Two Wells School	470	167
Total		3,035

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

SECTION 2.—DRY MASH.

Home Project Utility Section.

F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	3	248
	459	6	227
	460	5	217
		14	692
		23	1,238

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Class No. 4.

G. W. Lindsay, Torrens Road, Kilkenny (Langshans.)	461	—	48
	462	3	95
	463	4	190
		7	333

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 9th, 1935.	

Class No. 1.

Gallagher & Aslin, Pooraka	464	3	162
	465	4	199
	466	—	173
		7	534

The above birds are White Leghorns and, together with Nos. 307 and 309, will constitute a team in this class.

W. C. Slape, Magill	467	4	141
	468	4	176
	469	dead	
		8	317

Class No. 2.

Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	—	26
	472	—	145
	473	1	182
		1	353

Class No. 1.

Willow Bend, Stud Poultry Farm, North Walkerville	474	4	221
	475	—	7
	476	5	207
		9	435
	477	2	dead
	478	4	226
	479	4	221
		10	447
		19	882
Willow Bend, Stud Poultry Farm, North Walkerville	480	—	184
	481	5	178
	482	5	223
		10	585
	483	3	115
	484	—	176
	485	5	202
		8	493
		18	1,078

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED 9TH *MARCH*, 1935.—

FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	258	39
B. R. Whittington	246	141
J. O. Marshall	237	86
Trios—		
B. Cooke	668	319–321
V. E. Williams	613	298–300
A. & H. Gurr	612	196–198

Teams—		
A. & H. Gurr	1,109	193–198
A. G. Dawes	1,075	205–210
Gallagher & Aslin	1,069	307–309 and 464–466

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	205	332
V. F. Gameau (Minorca)	197	329
Langmaid & Bettison (Minorca)	182	473
Trios—		
V. F. Gameau (Minorcas)	456	328–330
A. Heaysman (Cuckoo Leghorns)	432	331–333
Langmaid & Bettison (Minorcas)	353	471–473

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	265	339
F. F. Welford	248	458
H. J. Mills	224	338
Trios—		
F. F. Welford	692	458–460
H. J. Mills	663	337–339
Willow Bend Stud Poultry Farm	585	480–482
Teams—		
F. F. Welford	1,238	373–375 and 458–460
H. J. Mills	1,163	334–339
Willow Bend Stud Poultry Farm	1,078	480–485

Class 4.—Any other Heavy Breeds.

Singles—		
A. G. Dawes (Rhode Island Red)	222	396
E. F. Snow (Rhode Island Red)	213	402
K. Pennack (Barnevelder)	198	414
Trios—		
A. G. Dawes (Rhode Island Reds)	571	394–396
K. Pennack (Barnevelders)	553	412–414
W. R. Williams (Rhode Island Reds)	492	403–405
Teams—		
A. G. Dawes	963	394–399
A. G. Dawes	881	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—		
A. O. Dawkins	216	419
A. J. Monkhouse	205	424
A. V. Dupen	199	423
Trios—		
A. O. Dawkins	586	418–420
A. J. Monkhouse	567	424–426
Teams—		
A. O. Dawkins	1,020	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	195	433
A. C. Byrne	178	432
A. C. Byrne	159	431

Trios—		
G. Frisby Smith	442	433–435
A. C. Byrne	429	430–432
Teams—		
A. C. Byrne	826	427–432

HOME PROJECT UTILITY SECTION.

Name.	School.	Breed.	Eggs Laid.	Bird No.
Eric Pratt,	Abattoirs	(White Leghorn) ..	235	441
F. Martin,	Gawler	(White Leghorn)	217	447
Max Couche,	Thebarton	(Rhode Island Red)	210	455
Stanley Pratt,	Abattoirs	(White Leghorn)	205	442

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to February 28th, 1935.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to Jan. 31st, 1935.	No. Eggs Laid Month of Feb., 1935.	Total Eggs Laid April 1st, 1933, to Feb. 28th, 1935.
No. 1 test	13,373	493	13,866
No. 2 test	12,408	349	12,757
No. 3 test	12,059	353	12,412
No. 4 test	13,258	342	13,600
No. 5 test	6,990	189	7,179

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during January.	Milk. Per Cow during January.	Milk. Per Cow March to January.	Butterfat. Per Herd during January.	Butterfat. Per Cow during January.	Butterfat. Per Cow March to January.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	30	25·39	13,912½	463·75	5,178·11	648·77	21·63	272·08	4·66
9/B ..	17	17	10,838	637·25	5,007·71	468·57	27·55	231·20	4·33
9/C ..	12	12·48	8,838½	736·51	5,765·38	372·81	31·07	252·22	4·22
9/D ..	32	27·65	19,827½	619·61	6,248·19	1,030·49	32·20	335·74	5·20
9/E ..	20	19·97	11,305	569·75	5,831·43	531·20	26·56	276·89	4·66
9/F ..	20	16·68	7,836½	391·83	5,001·09	358·33	17·92	256·60	4·56
9/G ..	33	32·03	22,957	695·67	5,900·20	1,061·73	32·17	300·15	4·62
9/H ..	19	19	13,407½	705·66	7,737·89	648·38	34·13	334·48	4·84
9/I ..	35	32·23	14,896	425·60	4,564·84	687·78	19·65	191·15	4·62
9/J..	58·68	39·55	19,481	332·08	3,835·00	668·19	11·39	155·71	3·46
9/K ..	24	18·84	7,873	328·04	3,777·73	401·91	16·75	184·08	5·10
9/L ..	27·55	13·26	4,990	181·12	3,769·60	197·45	7·17	147·71	3·96
9/M .	19	19	4,169½	219·45	2,036·36	192·30	10·12	92·31	4·61
9/N ..	27·65	20·90	8,055½	291·34	4,897·97	336·32	12·16	200·40	4·17
9/O ..	25	22·58	11,644½	465·78	5,374·91	500·83	20·03	233·92	4·30
9/P ..	46	31·81	9,801	213·06	4,370·20	497·01	10·80	202·35	5·07
9/Q ..	25	23·74	9,742	389·68	4,226·51	428·68	17·15	196·79	4·40
9/R ..	8	8	4,789½	598·68	4,882·51	252·47	31·56	239·30	5·27
9/S..	13·35	13	10,354	775·57	6,184·05	385·89	28·90	261·71	3·73
9/T ..	24·03	22·55	10,301	428·67	5,597·90	479·42	19·95	257·79	4·65
9/U ..	15	13·23	5,152½	343·50	4,087·19	256·89	17·13	217·74	4·99
9/V ..	10	5·81	1,614½	161·45	3,181·35	97·21	9·72	173·82	6·02
9/W .	29	28·45	15,866	547·10	4,078·96	591·51	20·40	164·52	3·73
9/X .	9	9	5,781½	642·39	—	294·16	32·68	—	5·09
Means	24·13	20·51	10,563·50	437·70	5,123·72	474·51	19·66	233·46	4·49

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during January.	Milk. Per Cow during January.	Milk. Per Cow October to January.	Butterfat. Per Herd during January.	Butterfat. Per Cow during January.	Butterfat. Per Cow October to January.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	32	21·97	9,899½	309·36	1,858·68	516·02	16·13	97·12	5·21
5/D ..	30	24·90	12,386½	412·88	2,056·45	676·52	22·55	110·40	5·46
5/E ..	38	31·13	16,845½	443·30	2,337·76	839·42	22·09	116·79	4·98
5/R ..	70·58	60·74	22,966½	325·39	1,972·59	1,049·58	14·87	88·24	4·57
5/Ee .	23	23	13,733	597·08	2,455·60	722·20	31·40	121·72	5·26
5/Z ..	33	21·23	15,927	482·64	2,782·35	826·50	25·05	141·22	5·19
5/Kk	15	13·87	10,454	696·92	2,784·72	481·40	32·09	129·64	4·60
5/Ww	20	15·35	6,573½	328·68	1,944·81	322·95	16·15	92·89	4·91
5/Xx	20	18·35	9,462½	473·18	2,340·51	509·31	26·47	122·08	6·02
5/5/Yy	11	9	0,921½	356·50	1,920·90	184·52	16·77	94·58	4·71
5/Aaa	17	15·42	6,889	405·23	2,211·94	334·72	19·10	108·88	4·86
5/Bbb	16·45	16	4,619	280·78	2,015·37	251·58	15·29	99·77	5·45
5/Ddd	26	22	19,132½	735·86	3,388·40	790·80	30·42	132·30	4·13
5/Eee	15·81	15·32	12,285½	777·07	2,633·05	516·46	32·67	117·94	4·20
5/Fff	10	10	4,386½	438·65	2,568·00	206·55	20·66	116·53	4·71
5/Ggg	9	9	4,541½	504·61	2,412·70	221·35	24·59	108·27	4·87
5/Hhh	13·94	12	9,067½	650·46	2,947·39	355·30	25·49	116·60	3·92
Means	23·58	19·96	10,770·06	456·04	2,331·65	521·48	22·12	110·76	4·84

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow July to January.	Per Herd during January.	Per Cow during January.	Per Cow July to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	8·42	7·39	4,624½	549·22	3,362·30	223·24	26·51	161·75	4·83
7/L ..	32·90	29·90	15,195	461·85	3,974·36	673·76	20·48	175·99	4·43
7/P ..	26	18·77	9,042	347·77	4,364·55	463·96	17·84	210·94	5·13
7/Oo .	25·06	22·61	10,201	407·06	4,063·65	511·44	20·41	184·34	5·01
7/Tt .	15·90	13·90	9,943	625·34	5,098·24	423·41	26·63	223·76	4·26
7/Uu .	28·81	23·77	5,514½	191·41	3,375·62	263·05	9·13	144·66	4·77
7/Xx	23	19·16	12,289	534·31	4,528·07	683·21	29·70	241·78	5·54
7/Bbb	64·68	48·61	31,070½	480·37	3,921·47	1,412·26	21·83	175·18	4·55
7/Ccc	24·94	20·42	10,379½	416·18	3,692·32	477·26	19·14	161·33	4·60
7/Ddd	13	9·94	5,872	451·70	4,258·60	278·10	21·40	206·18	4·73
7/Eee	10	7·65	4,037½	403·75	4,000·81	196·09	19·61	204·54	4·86
7/Ggg	17·19	12·48	5,936	345·32	2,542·51	276·43	16·08	115·98	4·66
7/Hhh	12	12	5,378½	448·21	4,799·31	188·10	15·68	167·63	3·50
7/Iii .	16	16	7,285	455·31	5,073·56	289·45	18·09	178·39	3·97
7/Jjj	13	8·94	2,607½	200·57	3,062·19	131·51	10·12	147·07	5·04
7/Kkk	30	28·45	17,968½	595·88	3,795·09	904·46	30·02	190·93	5·07
7/Lll	19·42	17·61	13,387½	677·32	4,214·14	688·29	44·90	225·71	5·32
7/Mmm	15	14·55	8,010½	534·03	3,160·30	397·98	26·53	163·07	4·97
Means	21·96	18·45	99,201·11	452·15	3,972·43	471·22	21·46	182·90	4·75

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow December to January.	Per Herd during January.	Per Cow during January.	Per Cow December to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18	15·48	4,794½	266·36	657·69	258·56	14·36	34·32	5·39
6/C ..	17	14·87	9,397½	552·79	1,242·12	412·28	24·25	51·35	4·39
6/Y ..	13·71	10·52	7,115½	519·00	907·14	300·99	21·95	38·58	4·23
6/Ff .	27	26·84	22,848½	846·24	1,859·87	911·99	33·77	73·84	3·99
6/Ii ..	20	13·32	12,248	612·40	1,229·35	525·03	26·25	52·14	4·29
6/Kk	20	18·06	12,476½	623·83	1,129·68	459·08	22·95	42·09	3·68
6/Ll .	25	21·35	15,113½	604·54	1,381·52	556·69	22·27	48·60	3·68
6/Oo .	18	16	11,733½	651·86	1,547·70	511·18	28·40	65·01	4·36
6/Ss	17	16·10	13,671	804·17	1,674·59	549·63	32·33	63·86	4·02
6/Tt .	22·74	18·71	14,629	643·31	1,326·31	589·38	25·92	53·84	4·03
6/Uu .	25·13	23·29	18,525	737·16	1,717·70	827·19	32·92	74·23	4·47
6/Xx	25·90	24·23	22,227½	858·20	1,825·56	921·62	35·58	73·98	4·15
6/Ccc	26	20·94	12,125½	466·35	1,187·57	527·58	20·29	51·92	4·35
6/Ddd	26	23	17,003½	653·98	1,282·97	764·21	29·39	56·04	4·49
6/Jjj	24·61	20·20	15,358	624·05	1,471·61	699·31	28·42	68·32	4·55
6/Mmm	9	7·94	8,160	906·67	1,909·01	327·57	36·40	78·89	4·01
6/Nnn	37	33·71	25,158½	679·96	1,408·80	1,112·14	30·07	59·13	4·42
Means	21·89	19·10	14,269·73	651·95	1,403·59	603·20	27·56	58·30	4·23

DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co. reported on March 1st, 1935, as follows:—

BUTTER.—Conditions in dairying during February were very difficult as, owing to the hot dry weather prevailing, it was hard for farmers to maintain the quality of their produce, and on the other hand, although the stock in most districts was hand fed, supplies showed a further decline. In some areas along the Murray, where irrigation was possible, supplies were maintained because of the cows being fed with green maize and lucerne. Values in London moved forward earlier in the month but have since receded somewhat and at date of report ruled from 80s. to 81s. per cwt. There was no change made in local prices, being:—Choicest creamery fresh butter, in bulk, 1s. 4½d. per lb.; prints and delivery extra; store butter, 6d. to 8d., according to quality; separator lines from 9d. to 1s. 1d. per lb. for choicest. These prices are subject to equalisation levies.

CHEESE.—The South-Eastern factories forwarded usual weekly consignments, which met with good demand from local and Westralian buyers, so that the floors were kept nicely cleared. Exporting still continues, but within the next week or two the final consignment will have been sent, as production is now quickly declining. Rates are:—Large and medium, from 8½d. per lb.; loaf from 9d. per lb., store door, delivery extra; semi-matured and matured, 9½d. to 10½d. per lb.

EGGS.—Supplies are now shortening, which is usual at this time of the year although the quantities marketed during recent weeks were less than for the corresponding period last year. However, this may be partly accounted for by seasonal conditions. Values have improved and at date of report were:—Ordinary country eggs, fair average quality, 6½d. per dozen net; long distance rail or shipping eggs lower; selected new laid clean eggs, 1⅞ozs. and over, 8½d. to 9d. per dozen net.

BACON.—As is usual in the summer time, consumption of bacon shrinks, but this was offset by the greater turnover in bacon factory small goods and cooked hams. Market continued steady at:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 8½d. to 9d.; hams, 1s. 1d. to 1s. 2d.; cooked hams, 1s. 3d. to 1s. 4d. per lb.

ALMONDS.—The new season's crop is now being marketed in increasing quantities and it is pleasing to record that there is an improved inquiry from interstate and local buyers. Large quantities, however, are not yet being placed on the market as growers, in many instances, are allowing the nuts to dry out thoroughly before consigning. Rates ruling at present are:—Softshells and Brandis, 7½d. to 8d. per lb.; hardshells, 4½d. per lb.; kernels, 1s. 9d. to 1s. 10d. per lb.

HONEY.—Sales of this commodity continue dull although supplies of the new season's honey were, generally speaking, of nice quality. The demand was not sufficient to absorb all lots offering and considerable quantities are still held in stock by the distributing merchants. Rates are:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades 1d. to 2d. per lb.

BEESWAX.—Was in better supply during the month and sales generally were sufficient to clear all lots offering at:—1s. 4d. to 1s. 4½d. per lb., according to quality. Discoloured lots lower.

LIVE POULTRY.—Sales are held every Tuesday, Thursday and Friday and our Sale Rooms are the best equipped in the State. Our auctions have been well attended by large numbers of buyers and the catalogues submitted met with ready quittance. The strongest demand as usual was experienced for prime quality, heavyweight, well-breasted birds but there were considerable quantities of old season's white Leghorn hens submitted and for these values were low as this type of poultry is not very suitable for table purposes. We advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 4s. 1d. to 5s. 1d.; nice conditioned cockerels, 3s. to 4s.; fair conditioned cockerels, 2s. 3d. to 2s. 10d.; chickens lower; heavyweight hens, 2s. 3d. to 2s. 11d.; medium hens, 1s. 6d. to 2s. 11d.; light hens, 1s. to 1s. 4d.; couple of pens of weedy sorts lower. Prime young Muscovy drakes, 3s. 6d. to 4s. 3d.; young Muscovy ducks, 2s. 3d. to 2s. 10d.; ordinary ducks, 1s. 2d. to 2s.; ducklings lower. Geese, 2s. 9d. to 3s. 9d.; goslings lower. Turkeys, good to prime condition, 8½d. to 10d. per lb. live weight; turkeys, fair condition, 6½d. to 8d. per lb. live weight; turkeys, poor and crooked-breasted lower. Pigeons, 2d. to 3d. each.

POTATOES.—New season's, 10s. per cwt.

ONIONS.—New season's, 9s. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., JANUARY, 1935.

IMPORTS.

Interstate.

Apples (Bushels)	137
Apricots (bushel)	1
Bananas (bushels)	19,570½
Citrus—	
Grape Fruit (bushels)	10
Oranges (bushels)	377
Mixed Fruit (bushel)	1
Passion Fruit (bushels)	83
Peaches (bushels)	10
Pineapples (bushels)	950
Currants, Black (bushels)	8
Peanuts (bags)	219
Peanuts, Kernels (bags)	48
Beans (bushel)	1
Carrots (bags)	20
Onions (bags)	87
Potatoes (bags)	64
Pumpkins (bag)	1
Bulbs (packages)	15
Plants (packages)	44
Seeds (packages)	59
Tubers (packages)	2
Wine casks (No.)	3,017
Fumigated—	
Citrus—	
Grape Fruit (bushels)	10
Oranges (bushels)	205
Wine casks (No.)	12
Rejected—	
Bananas (bushels)	31½
Passion Fruit (bushels)	2
Second-hand bags	12
Second-hand cases	2

Overseas.

(State Law.)

Wine casks (No.)	2,222
Fumigated—Wine casks (No.)	198

Federal Quarantine Act.

	Packages.	Lbs.
Seeds, &c.	4,565	747,330
Plants	1	22 (No.)
Canes	112	—
Cocoanut Chests	273	—
Tea Chests	5,297	—
Timber	190,680	2,368,058 sup. ft.

EXPORTS.

Federal Commerce Act.

		Packages.
India	Apples	16
	Peaches	20
	Plums	25
	*Vegetables	5
Netherlands, East Indies	Plums	50
Singapore	Apricots	12
	Citrus—Lemons	2
	Peaches	4
	Pears	17
	Plums	75
	*Vegetables	48
Straits Settlements	Plums	6
	*Vegetables	2

* Excluding Potatoes.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of February, 1935, also the average precipitation for February and the average annual rainfall.

Station.	For Feb. 1935.	Av'ge. for Feb.	Total Rain for 1935.	Av'ge. Annual Rain-fall.
Far North and Upper North.				
Oodnadatta	—	0·57	0·95	4·66
Marree	—	0·50	0·75	5·88
Farina	—	0·53	0·82	6·43
Copley	—	0·52	0·49	7·87
Beltana	—	0·65	0·31	8·48
Blinman	—	0·73	0·20	11·86
Hookina	—	0·45	0·63	11·25
Hawker	0·01	0·57	0·69	12·26
Wilson	—	0·62	0·82	11·79
Gordon	—	0·78	0·57	10·53
Quorn	—	0·60	0·65	13·22
Port Augusta	—	0·52	1·50	9·44
Bruce	—	0·58	0·76	9·87
Hammond	—	0·60	0·90	11·21
Wilmington	—	0·59	0·81	17·32
Willowie	—	0·72	0·93	12·25
Melrose	0·02	0·86	1·35	22·88
Booleroo Centre	—	0·66	1·06	15·21
Port Germein	—	0·51	1·43	12·53
Wirrabara	—	0·68	1·63	19·29
Appila	0·01	0·68	1·52	14·65
Cradock	—	0·65	0·54	10·82
Carrieton	—	0·58	0·55	12·23
Johnburg	—	0·53	0·42	10·58
Eurelia	—	0·62	0·56	12·79
Orroroo	—	0·64	1·00	13·20
Nackara	—	0·68	0·16	11 09
Black Rock	—	0·63	0·53	12·37
Oodlawirra	—	0·61	0·56	11·68
Peterborough	—	0·60	0·76	13·22
Yongala	—	0·67	0·85	14·44
North-East.				
Yunta	—	0·62	0·12	8·55
Waukaringa	—	0·51	0·20	7·94
Mannahill	—	0·68	0·24	8·20
Cockburn	—	0·61	0·22	7·96
Broken Hill, N.S.W.	0·25	0·85	0·34	9·56
Lower North.				
Port Pirie	—	0·53	1·91	13·21
Port Broughton	0·03	0·54	1·61	13·88
Bute	—	0·52	1·31	15·44
Laura	—	0·70	1·54	17·95
Caltowie	0·02	0·69	1·40	16·74
Jamestown	0·02	0·66	1·14	17·69
Gladstone	0·06	0·61	2·01	16·29
Crystal Brook	0·09	0·63	2·25	15·78
Georgetown	0·06	0·71	1·95	18·37
Narridy	0·09	0·62	1·88	15·82
Redhill	—	0·63	2·14	16·59
Spalding	—	0·80	1·72	18·88
Gulnare	0·02	0·81	1·78	18·68
Yacka	—	0·64	1·87	15·39
Koolunga	0·02	0·65	1·91	15·38
Snowtown	0·02	0·53	1·08	15·74
Lower North—*continued*.				
Brinkworth	0·02	0·69	1·97	15·82
Blyth	—	0·64	1·95	16·78
Clare	—	0·82	1·84	24·51
Mintaro	—	0·75	1·50	23·42
Watervale	0·03	0·80	2·02	26·80
Auburn	0·03	0·84	1·43	23·98
Hoyleton	—	0·57	1·15	17·33
Balaklava	0·04	0·57	1·10	15·46
Port Wakefield	—	0·63	0·88	12·94
Terowie	—	0·81	0·62	13·35
Yarcowie	—	0·72	0·65	13·59
Hallett	0·02	0·70	1·50	16·46
Mount Bryan	—	0·80	1·76	16·83
Kooringa	—	0·69	1·08	17·85
Farrell's Flat	—	0·65	1·16	18·61
West of Murray Range.				
Manoora	0·04	0·63	1·49	18·92
Saddleworth	0·01	0·72	1·23	19·60
Marrabel	—	0·62	1·06	19·96
Riverton	—	0·68	0·93	20·81
Tarlee	—	0·64	0·88	18·10
Stockport	—	0·61	0·74	16·93
Hamley Bridge	—	0·65	0·71	16·54
Kapunda	—	0·70	0·78	19·79
Freeling	0·02	0·62	1·12	17·83
Greenock	—	0·70	0·93	21·53
Truro	—	0·68	0·76	19·89
Stockwell	—	0·71	0·66	20·13
Nuriootpa	—	0·67	0·94	20·72
Angaston	0·01	0·71	0·78	22·42
Tanunda	—	0·66	1·18	22·02
Lyndoch	—	0·69	1·00	23·40
Williamstown	—	0·72	0·97	27·77
Adelaide Plains.				
Owen	—	0·86	0·96	14·66
Mallala	—	0·62	0·71	16·56
Roseworthy	0·01	0·58	1·00	17·40
Gawler	—	0·69	0·93	18·91
Two Wells	0·03	0·55	1·09	15·75
Virginia	—	0·59	1·20	17·18
Smithfield	—	0·73	1·28	17·64
Salisbury	—	0·64	1·03	18·56
Adelaide	0·02	0·73	0·80	21·15
Glen Osmond	0·01	0·72	0·99	26·05
Magill	0·07	0·82	1·11	25·53
Mount Lofty Ranges.				
Teatree Gully	0·04	0·88	1·36	27·20
Stirling West	0·37	1·22	2·13	47·08
Uraidla	0·05	1·11	2·05	44·19
Clarendon	—	0·88	1·26	32·88
Happy Val'y Res.	—	—	0·78	—
Morphett Vale	—	0·73	0·69	22·66
Noarlunga	—	0·69	0·69	20·37
Willunga	0·02	0·80	0·61	26·02
Aldinga	—	0·70	0·45	20·27

RAINFALL—*continued.*

Station.	For Feb. 1935.	Av'ge. for Feb.	Total Rain for 1935.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*				
Myponga	0·07	1·17	0·75	29·50
Inman Valley	0·41	—	1·06	20·68
Yankalilla	—	0·78	0·42	22·83
Mount Pleasant	0·11	0·77	0·88	27·23
Birdwood	0·08	0·72	1·35	29·21
Gumeracha	0·09	0·83	1·28	33·41
Millbrook Res.	0·04	1·12	1·61	34·68
Tweedvale	0·12	0·89	1·44	35·99
Woodside	0·18	0·90	1·53	32·31
Ambleside	0·11	0·88	1·44	34·90
Nairne	0·37	0·91	1·71	28·22
Mount Barker	0·36	0·92	1·55	31·31
Echunga	0·66	0·92	1·81	33·30
Macclesfield	0·48	0·90	1·27	30·43
Meadows	0·54	0·98	1·31	36·16
Strathalbyn	0·33	0·72	0·94	19·31
Murray Flats and Valley				
Meningie	0·12	0·61	0·81	18·37
Milang	0·12	0·57	0·49	14·91
Langhorne's Ck.	—	0·62	0·69	14·87
Wellington	0·08	0·59	0·87	14·65
Tailem Bend	0·12	0·79	0·95	15·06
Murray Bridge	0·18	0·59	0·71	13·56
Callington	0·28	0·57	0·73	15·19
Mannum	0·14	0·50	0·56	11·49
Palmer	0·01	0·67	0·32	15·63
Sedan	0·04	0·54	0·23	12·11
Swan Reach	—	0·72	0·51	10·64
Blanchetown	0·04	0·57	0·34	11·01
Eudunda	0·01	0·65	0·90	17·17
Pt. Pass	—	0·57	0·96	—
Sutherlands	—	0·53	0·49	10·84
Morgan	—	0·56	0·32	9·17
Waikerie	—	0·96	0·39	9·65
Overland Corner	—	0·66	0·58	10·32
Loxton	—	0·98	0·59	11·54
Berri	0·07	0·91	0·91	10·17
Renmark	0·02	0·76	0·60	10·41
West of Spencer's Gulf				
Eucla	0·47	0·68	0·70	9·96
Nullarbor	—	0·48	0·09	8·81
Fowler's Bay	—	0·49	0·35	11·94
Penong	—	0·72	0·39	12·27
Koonibba	0·03	0·86	0·32	12·13
Denial Bay	—	0·64	0·23	11·36
Ceduna	—	0·58	0·24	10·16
Smoky Bay	—	0·53	0·12	10·53
Wirrulla	—	0·39	0·89	10·54
Streaky Bay	—	0·50	0·22	14·88
Chandada	—	—	0·34	—
Minnipa	—	0·78	0·58	14·06
Kyancutta	—	—	0·61	—
Talia	—	0·43	—	14·76
Port Elliston	0·04	0·45	0·63	16·54
Lock	—	0·75	0·21	16·52
Mount Hope	—	—	0·38	—
Yeelanna	—	0·50	0·69	15·94
Cummins	—	0·59	0·26	17·60
Port Lincoln	0·20	0·52	0·39	19·42
Tumby	0·05	0·55	0·35	14·12
Ungarra	—	0·68	0·74	16·85
Port Neil	0·03	0·73	0·37	13·09

Station.	For Feb. 1935.	Av'ge. for Feb.	Total Rain for 1935.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—*continued.*				
Arno Bay	0·06	0·68	0·50	12·65
Rudall	0·03	0·76	0·39	12·64
Cleve	0·16	0·68	0·65	14·83
Cowell	0·04	0·61	0·70	11·07
Miltalie	0·21	0·65	1·36	13·67
Mangulo	0·03	0·82	0·74	13·91
Darke's Peak	—	0·80	0·76	15·18
Kimba	—	0·91	1·32	11·82
Yorke Peninsula.				
Wallaroo	0·01	0·51	1·26	13·98
Kadina	—	0·51	1·10	15·64
Moonta	0·03	0·53	0·97	15·06
Paskeville	0·03	0·48	0 77	15·49
Maitland	0·16	0·65	1·51	19·90
Ardrossan	—	0·48	0·82	13·97
Port Victoria	0·07	0·51	0·60	15·44
Curramulka	—	0·52	0·45	17·87
Minlaton	0·02	0·50	0·36	17·79
Port Vincent	0·03	0·61	0·42	14·43
Brentwood	—	0·55	0·31	15·55
Stansbury	—	0·50	0·36	16·82
Warooka	—	0·54	0·27	17·49
Yorketown	0·01	0·50	0·37	16·88
Edithburgh	0·06	0·54	0·44	16·37
South and South-East.				
Cape Borda	0·22	0·65	0·56	24·82
Kingscote	0·05	0·60	0·23	19·14
Penneshaw	0·07	0·82	0·37	18·92
Victor Harbour	0·18	0·74	0·56	21·37
Port Elliot	0·07	0·72	0·48	19·93
Goolwa	0·16	0·69	0·59	17·85
Maggea	—	0·67	0·53	10·04
Copeville	0·04	0·77	0·62	11·51
Claypans	—	0·64	0·62	10·38
Meribah	0·01	0·75	0·68	11·31
Alawoona	—	0·70	0·38	10·36
Caliph	—	—	0·29	—
Mindarie	0·12	0·66	0·62	12·21
Sandalwood	0·14	0·72	0·72	13·66
Karoonda	0·06	0·79	0·88	14·36
Pinnaroo	0·09	1·00	0·65	14·43
Parilla	0·10	0·76	0·50	13·82
Lameroo	0·08	0·81	0·56	15·97
Parrakie	0·10	0·76	0·87	14·62
Geranium	0·04	0·75	1·04	16·51
Peake	—	0·86	0·79	16·01
Cooke's Plains	0·03	0·64	0·64	15·30
Coomandook	0·02	0·67	0·68	17·09
Coonalpyn	0·04	0·64	0·77	17·61
Tintinara	—	0·81	0·97	18·71
Keith	—	0·95	0·49	17·92
Bordertown	0·03	0·80	1·38	19·21
Wolseley	0·03	0·77	0·96	18·49
Frances	0·12	0·80	0·64	20·11
Naracoorte	0·11	0·76	1·20	22·66
Penola	0·16	0·88	1·18	26·01
Lucindale	0·28	0·70	1·31	23·34
Kingston	0·07	0·71	0·93	24·28
Robe	0·07	0·76	1·03	24·67
Beachport	0·24	0·93	1·28	27·09
Millicent	0·35	1·05	1·59	29·79
Kalangadoo	0·34	1·53	1·70	32·28
Mount Gambier	0·34	1·08	1·48	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. Mar.	Dates of Meetings. Apr.
Monarto South Women's	1045	16	20
Moorlands	*	—	—
Morchard	*	22	20
Morchard Women's	1045	27	24
Mount Barker	*	18	15
Mount Bryan	*	—	—
Mount Compass	*	—	—
Mount Gambier	1032	8	12
Mount Hope	1039	19	16
Mount Pleasant	*	8	12
Mudamuckla	*	9	13
Mundalla	†	—	—
Mundalla Women's	*	21	18
Murray Bridge	*	20	17
Murraytown	*	—	—
Mypolonga	*	—	—
Myponga	*	21	18
Myrla	*	20	17
Nantawarra	*	14	18
Naracoorte	*	9	13
Narridy	†	—	—
Narrung	*	—	—
Nelshaby	*	—	—
Nelshaby Women's	1047	—	—
Netherton	*	20	17
Nunjikompita	*	14	18
Nunkeri	*	14	18
O'Loughlin	*	11	8
O'Loughlin Women's	*	—	—
Overland Corner	*	20	17
Owen	*	11	8
Palabie	*	—	—
Parilla	*	19	16
Parilla Women's	*	20	18
Parilla Well	*	18	22
Parilla Well Women's	*	26	30
Parrakie	*	—	—
Parrakie Women's	*	27	24
Paruna	*	1	5
Paskeville	1038	19	16
Pata	*	1	5
Penola	*	2	6
Penola Women's	†	—	—
Penwortham	†	20	17
Petersville	*	19	16
Petina	*	23	27
Pinbong	*	—	—
Pinnaroo	*	—	—
Pinnaroo Women's	*	8	5
Port Elliot	*	—	—
Pygery	*	19	16
Pygery Women's	*	—	—
Quorn	*	—	—
Ramco	*	18	15
Redhill	†	—	—
Rendelsham	†	16	13
Rendelsham Women's	†	—	—
Renmark	*	—	—
Riverton	*	11	8
Roberts and Verran	1039	—	—
Rosedale	*	—	—
Roseworthy	*	—	—
Rudall	*	16	16

Branch.	Report on Page.	Dates of Meetings. Mar.	Dates of Meetings. Apr.
Saddleworth	*	22	—
Saddleworth Women's	*	5	2
Scott's Bottom	†	16	13
Sheoak Log Women's	†	—	—
Shoal Bay	*	19	16
Smoky Bay	*	—	—
Snowtown	*	8	12
Snowtown Women's	†	7	4
South Kilkerran	*	19	16
Springton	*	6	3
Stanley Flat	*	18	15
Stockport	*	—	—
Strathalbyn	*	13	10
Streaky Bay	*	22	26
Sutherlands	1035	7	4
Talia	*	29	26
Tantanoola	*	2	6
Tantanoola Women's	†	6	3
Taplan	*	19	—
Taplan Women's	*	—	—
Taragoro	*	14	18
Tarlee	*	—	—
Tatiara	*	—	—
Tintinara	*	—	—
Truro	1036	18	15
Tweedvale	*	21	18
Ungarra	*	21	25
Upper Wakefield	*	—	—
Uraidla and Summerton	*	4	1
Waddikee Rocks	*	16	13
Waikerie	*	8	12
Wallala	*	13	10
Wanbi	*	27	24
Wandearah	*	19	16
Warcowie	*	19	16
Warcowie Women's	*	—	—
Warramboo	*	19	16
Warramboo Women's	†	—	—
Wasleys	†	14	11
Wasleys Women's	†	7	4
Watervale	*	18	15
Waurultee	*	19	16
Weavers	*	11	8
Wepowie	1034	18	15
Wepowie Women's	*	—	—
Wilkawatt Women's	*	19	16
Williamstown Women's	†	6	3
Willowie	*	25	22
Wilmington	†	12	9
Wilmington Women's	*	—	—
Wirrabara	*	—	—
Wirrabara Women's	1048	21	18
Wirrilla	*	28	13
Wirrilla Women's	*	14	11
Wirrulla	*	20	17
Wolseley	*	11	8
Wudinna	*	—	—
Yadnarie	*	19	16
Yandiah	†	8	12
Yaninee	*	—	—
Yeelanna	*	20	17
Yundi	†	20	—
Yurgo	*	—	—
Yurgo Women's	1048	—	—

* No reports received during the month of February † Held over.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

PROBLEMS CONFRONTING THE DAIRY INDUSTRY IN THE SOUTH-EAST.

Paper read by Mr. W. H. Downes, H.D.D. (District Dairy Instructor), at a meeting of the Mount Gambier Branch of the Agricultural Bureau.]

Improved Quality Milk and Cream Essential for Future Progress.

With the general expansion and tremendous increase in dairying, both in this and other districts we have reached a stage in the industry to-day, almost without parallel in history, where the extent of production has so rapidly overtaken the rate of consumption The extent of this growth may be gauged by the fact that during the past 9 years, New Zealand has just doubled her production of dairy commodities, Australia by at least 60 per cent., and in fact, there has been a general increase of considerable magnitude right throughout the world. The result of this is that there is a fairly large surplus to dispose of, through the avenue of export, and unfortunately the difficulty of placing some of the produce has been accentuated by the fact that its quality has not been consistently good. Many of our previous markets overseas—principally on the Continent—are now closed, and we have to depend almost solely on the London market. In the past this market has proved a valuable outlet, capable of absorbing enormous quantities of both cheese and butter; production has increased at such an astonishing rate throughout the Dominions, however, that its capacity in this respect has been so sorely taxed, that the saturation point has already been reached. With an abundant supply of dairy produce available, it naturally follows that buyers can be far more discriminating than they ever were before; consequently any defects in the quality are quickly noticed, and this class of commodity is readily rejected. The most probable conclusion to be drawn from these facts is that the selling potentialities of dairy produce will be chiefly gauged for some time to come on the basis of quality.

Recent Local Improvements.

Producers are probably well aware of the steps recently taken by local factories; the bulk of which are cheese factories; in ensuring a better quality raw material, and all dairymen who co-operated in this direction are to be commended for their assistance and support. As a result, the grading of export cheese this season has shown a marked improvement over any previous year, yet while this is true, there is still a considerable quantity of inferior quality cheese going away. While occasionally there may be a fault in the manufacture, given good quality material in the first place, the majority of district managers can turn out a good article. To support this opinion, comments by the graders from time to time indicate that the quality of raw material is one of the chief drawbacks, or that most of the defects noticed in the flavour of cheese are due more often to the processing of some tainted milk, rather than to errors of manufacture. The stricter grading of milk has received attention by all managers, but while they have been firm regarding the rejection of any milk possessing undesirable bacterial taints, strong feed flavours, or high acid, there is a certain type of milk which is objectionable, yet which is not always so easy to detect on the receiving platform. This refers to milk of "borderline" quality, one of the most difficult to define because of its uncertain character, *i.e.*, it is hardly bad enough to reject entirely, but is not the best for cheesemaking purposes. In many cases this milk may have received a late, though heavy, inoculation of germ life, which when first delivered had hardly had sufficient time to develop. Given favourable temperatures associated with the cheesemaking process, their development may be extremely rapid, and the consequent deterioration in quality will prove both puzzling and worrying to the cheesemaker.

Methods Which Should Ensure a Cleaner, Better Quality Milk Supply.

As a general rule, little trouble is experienced with the quality of milk during the colder months of the year, but it is quite another story with the advent of warmer weather. Unfortunately, it is not compulsory to cool milk in South Australia, for though this treatment was provided for in the Dairy Industry Act, the clause was deleted soon after the Act became law. Most other States where dairying is practised to any extent make this a compulsory measure, and, may it be said, greatly to their advantage. While no one cares about compulsion, and would much prefer voluntary tactics, the practice would never become general unless strict enforcement was made possible.

The Value of Cooling.

If efficient cooling of milk was faithfully carried out by all suppliers, fully 50 per cent. of the present troubles would automatically disappear. To illustrate how greatly the keeping qualities of milk may be enhanced by cooling, a recent experiment could be quoted. During a warm spell some milk of reasonably good quality was divided into two equal portions. One half was cooled immediately after milking to a temperature of 70 degrees F., while the other received no treatment, and was merely allowed to cool down naturally as well as it could under the circumstances. The result was that the cooled or treated milk remained sweet for 80 hours, while the portion which was untreated became sour in the course of 25 hours. Such a definite contrast should surely commend the process of cooling to the dairymen of this district, and would probably be the means of saving much of the milk which is usually lost at this time of the year. Besides checking excessive acid and other bacterial development, cooling has the added advantage that it assists in reducing objectionable fodder taints which may be present in milk as a result of feeding cows on rank flavoured food. The mere act of cooling and exposure to the air during the process enables many feed gases to escape, but greater assistance will be given if the milk is regularly stirred at frequent intervals. Cooling, to be properly efficient, will need to be something better than merely standing the cans of milk in a tub or trough of water. Better results will be secured even by this method if the water in which the cans are standing is constantly changed. There is, of course, a far better way of cooling milk when one of the modern water-cooled milk coolers is utilised. The milk flows over the outer metal surface of the cooler, which is internally cooled by a continuous stream of cold running water. The midget types, suitable for a small dairy, receive their water supply from a water bag, but the larger ones, requiring a bigger flow of water, are usually connected directly to a water tap. The cost of a cooler is not so very great when the wonderful improvement achieved in quality by its use is taken into consideration, and with ordinary care a cooler should last a long time.

Yard Contamination.

The cleanliness of the surroundings where milk is kept, and the effect on its purity and keeping quality, is a much more important factor than many producers imagine. Otherwise, the more or less general practice of at present allowing milk to remain all night on a stand in the vicinity of the milking yard would not be permitted to continue. There is, firstly, the danger that the milk may absorb certain yard odours of objectionable nature through direct exposure to them, and, secondly, windy nights will favour direct bacterial contamination through dust, &c., filtering into the open cans. In this way quality may be quite seriously affected on occasions, no matter how clean or careful other procedures may be. It is unfortunate, though nevertheless true, that some of the very worst forms of organisms are transmitted to the milk in this manner, frequently resulting in untold damage to the quality of cheese manufactured from it.

The Effect of High Acid.

Although the South-East enjoys a fairly temperate climate, at certain periods of the year the acidity of some of the milk received at factories is much too high to entertain any hope of making high quality cheese from it. Acidity in milk or cream refers to the lactic acid which develops in it as a result of a bacterial fermentation, in which the milk sugar or lactose becomes converted into two separate products, namely, lactic acid and CO_2. In some cases—particularly where no additional bi-products are released during the fermentation—it could be described as a clean fermentation. There are, unfortunately, a great many objectionable types of organisms which, besides lactic acid producing, form many other bi-products, including gases, which are naturally injurious to flavour, and makes them most undesirable. For this reason, any milk containing a high percentage of acid is usually considered as doubtful, and always open to suspicion.

The degree or percentage of acid in milk can be readily ascertained by a quick titration test. This test involves the use of two solutions: the first, an alkali, which is usually a deci-normal solution of sodium hydrate; the second, a chemical indicator, known as phenolphthalein. The first solution is used to neutralise the acid in a carefully measured volume of milk (9 c.cs.), to which 3 drops of the indicator have already been added. The development of a faint pink tint in the milk denotes when neutralisation has taken place. The percentage of acid in the milk is determined by the amount of alkali necessary to produce this delicate shade of pink, and the higher the acid the greater the quantity of alkali required.

Most cheesemakers experience difficulty in making cheese of even fair quality from vat milk exceeding 0.2 per cent. of acid. Even allowing for the fact that the bulk of the milk received has an initial acidity of 0.15 to 0.17, no individual can of milk should be received for cheesemaking purposes which tests 0.3 or over, and even this seems to be a trifle too high.

WHEY CARTING IMPROVEMENTS.

There is no doubt that the local cheese factories have effected a wonderful improvement in milk quality by asking their suppliers to refrain from carting whey home in the cans ordinarily used for milk delivery. While this measure may have appeared rather tedious and inconvenient to several of the larger suppliers, it is pleasing to record that they have accepted it. Results have shown that it has been well worth while, if one is permitted to form this conclusion from the improvement in the standard of grading. In addition, the washing and steaming of milk cans in vogue at some factories should prove a boon to suppliers who have not got the same facilities at home to do this work.

This matter has also made a considerable difference to the value of the produce, and no doubt will commend itself to other factories when time and finance permit of suitable can washing arrangements being installed. The fact is that with present selling conditions on a greatly overloaded market, we cannot afford to neglect any opportunity which presents itself for the improvement of our product. If we do, the more progressive enterprising manufacturer must assuredly gain by capturing the bulk of the trade, at our loss and ultimate disadvantage. These remarks refer principally to matters associated with milk and cheese manufacture by reason of the fact that this industry is more strongly represented here than that of buttermaking. In a fairly wide sense, however, many of the points apply equally as well to cream and to butter.

It is regrettable that the development of an over-keen competition for cream supplies between the various factories has created an awkward position, which does not always permit of the best grading tactics being faithfully carried out in every case from factory to factory. This perhaps does not apply so much to the South-East as it does to other parts of the State, where butter factories and cream depots are more numerous. The result of such a position is obviously very unsatisfactory, for besides being very misleading from the suppliers' point of view, it is uneconomic and commercially unsound. Proof of this may be gleaned from the fact that the grading of South Australian butter during the season has been anything but satisfactory, and it appears high time that the whole scheme was revised and tightened up. During the warmest weather we have experienced it has proved a very difficult matter to obtain anything like a fair percentage of good choice cream, despite what factory returns might lead us to believe.

The commonest fault noticed in cream is that of staleness. Next to this comes "unclean" taint, followed by strong, feedy flavour; then "metallic" and "tallowy" flavours. The first-mentioned fault—that of staleness—is due to the fact that the cream is held too long by the supplier before being delivered to the factory. In some cases small supplies and transport difficulties are factors which militate against prompt delivery of cream, but the reasons quoted, though probably quite sound and excusable under the circumstances, are not in every instance responsible for the great bulk of stale cream arriving at our factories and depots. With some suppliers I know that a false belief exists that factories cannot churn fresh cream, or possibly that the older the cream becomes the more the test improves. Both these arguments are quite unsound, but whichever the reason, the sooner suppliers can be impressed with the necessity for a fresh cream supply, the better for each of them individually, and the industry as a whole. Unclean taint is another trouble which becomes predominant in cream at about this time of the year. While some of the fault might be attributed to the greater activity of undesirable organic growth under more favourable conditions of temperature, some blame at least is due to the rush of harvest work, resulting in the separator only being washed once a day. When the bowl of a separator is used in an unclean condition, the amount of contamination is surprisingly high, and to anyone who is unacquainted with this fact, I would suggest that they examine it for themselves by pulling the bowl asunder. Once they have done this they would doubtless be convinced of the damage they are inflicting on the quality of their cream, and would not feel disposed to continue with this practice.

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WEPOWIE (Average annual rainfall, 12.46in.).

September 10th.—Attendance: 11.

Mr. J. Jasper read an instructive paper, "Care of the Harvester." A good discussion followed.

Eleven members attended the meeting on October 1st, when Mr. E. L. Orchard (District Agricultural Instructor) delivered an address.

WEPOWIE.

February 11th.—Attendance: 8.

HARVEST REPORTS.—Mr. J. Burns reported: Ranee, on stubble 14bush., on fallow 17bush.; Nabawa and Felix, 15bush., Waratah, 12bush. Mr. J. Crocker: Ranee 4H, 18bush., Nabawa, 15bush. (these varieties were sown dry, and yielded 12bush. and 11bush. respectively), Sultan, 10bush. Ranee, he stated, shook freely, and Nabawa lodged badly. Mr. T. Orrock: Ranee 4H, on ley land fallow, 15bush., on stubble fallow, 18bush., Felix, 18bush., Dundee 15bush., Ghurka and Nabawa, 12bush., with a farm average of 16bush. Mr. W. Roocke: Turvey, Kerley's Early, Ranee 4H, Sword, Nabawa, and Sultan gave a fallow average of 14½bush., stubble sown wheats, 12bush. Mr. H. Noske: Ranee, 12bush., after being very badly shaken, Nabawa, which lodged, 9bush., Joffre, attacked by hoppers, 9bush. Mr. E. Roocke: A 14bush. average over a large area, covering stubble and fallow, Ranee, 20bush., Free Gallipoli, 12bush. and 18bush., Waratah and Sultan, 15bush. and 10bush., Ranee 4H and Ranee, 16bush. and 15bush., Nabawa, Sword and Waratah, 15bush., Sultan and Ranee, on stubble, 10bush. (Secretary, E. Roocke.)

Other Report Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Morchard	22/2/35	10	Discussion	E. Tilbrook

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

February 18th.—Attendance: 11.

HARVEST REPORTS.—Members' reports on the 1934-5 harvest indicated very favourable returns. Many varieties of wheat received a severe setback early in the season, but responded to the excellent finish. Currawa averaged 27bush. to 30bush., and Ranee 30bush. Other varieties returned fair yields, but severe storms reduced their yields very considerably. Barley returned approximately 10 bags per acre. Mr. Halse reported having sown 1 bag of seed (Victorian) oats, from which he reaped 31 bags. The wool clip was light, and lambing percentages low, owing to lack of feed. Citrus crops are fair, with other fruits good. (Secretary, B. Giddings.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Redhill	19/2/35	10	Discussion	S. Pengilly
Yandiah	8/2/35	9	Harvest Reports	O. Borgas

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

February 14th.—Attendance: 9.

HARVEST REPORTS.—On the average, yields of cereals during the past harvest were reported as having been quite satisfactory. In some cases excellent averages were recorded, although heavy losses were caused by wind and grasshoppers. Gallipoli was the most popular wheat. (Secretary: K. Dunn.)

SUTHERLANDS (Average annual rainfall, 10.88in.).

November 1st.—Attendance, 14.

OUR BIRDS OF PREY.—In the course of an address on this subject Mr. E. Boehm referred to the hawks, owls, &c., that were observed in the Sutherlands district; and

exhibited stuffed skins from his collection. He pointed out that a good deal of confusion existed concerning the various birds of prey, the valuable birds often being mistaken for those that were destructive. Mention was made of the hawks that destroyed grasshoppers and other noxious insects, and it was shown that by preying on weak specimens of other birds the hawks helped Nature to maintain her balance. The nocturnal birds of prey took mice and rats and also large numbers of injurious insects. Hawks which should be protected by the farmer included the Nankeen Kestrel, Brown Hawk, Grey Falcon, Sparrow Hawk, Spotted Harrier, Black-shouldered Kite, Little Eagle, and Whistling Eagle. Those which did some damage and should be kept under control were the Little Falcon, Common Goshawk, and Wedge Tailed Eagle. The nocturnal birds which deserved protection were the various kinds of Owls, Nightjars and Frogmouth.

A previous meeting was held on October 4th when reports of the delegates who attended Congress were received and discussed. (Secretary, E. Schiller.)

TRURO (Average annual rainfall, 19.95in.).
November 19th.—Attendance, 12.

SHED CONSTRUCTION.—Paper read by Mr. L. Miller: "Although the construction of up-to-date farm buildings usually requires the services of a tradesman, quite a number of useful buildings can be erected by the average farmer, providing a little forethought and judgment are used. Every farmer who takes a pride in his horses will see they are provided with protection from the weather. I fully realize the difficulties that confront a settler taking up an unimproved property. Usually a few fork posts and rails are quickly erected, covered with straw, with perhaps mallee shorts or straw around the back and ends, but where practicable, a stable should be built of stone walls, with a gable iron roof facing the north, with an open front, built in size according to circumstances, and preferably on sloping ground to allow for drainage. A good, roomy manger, constructed of timber and flat galvanized iron, is most economical and efficient. This should be erected for each horse, so that every animal gets its share of the feed without interference. A separate compartment or loose box at the end of the building is always useful. A stable should be enclosed with a strong post and rail and wire-netting fence, extending from each end for several yards, from 4ft. to 6ft. high. This will make a poultry-proof enclosure and a building strong, durable, and fireproof. Where a chaffing plant is erected, this should be done immediately at the rear of the stable or at the most convenient possible place. The next building of consideration is providing weather protection for the implements. This can be done neatly and cheaply with three rows of good strong fork posts to carry the beams placed 3ft. in the ground; the centre row should be 3ft. to 4ft. higher than the outside. Rails wired from the centre beam to outside beams and covered with a thick layer of straw will keep the place dry in the winter and cool in summer; ends and back closed with corrugated galvanized iron will complete an excellent implement shed, and one that can be converted into a shearing-shed when the occasion arises. It may also be used as a protection for vehicles.

A barn for the conservation of corn is also important; one of timber and galvanized iron would prove the cheapest, with a board floor or gravel and cement, and where possible, erected on sloping ground with a door at the back and front, so that the back door is level with the ground and the front door about 4ft. from the ground, which will prove convenient for unloading and loading. Shelter or housing of cows: The proposed Dairy Act provides all the information regarding an up-to-date dairy yard, and anyone contemplating the erection of same would be well advised to build on those lines.

In connection with cover for poultry, this can be done quite effectively when it is only a case of providing shelter at night with either a timber and iron or iron and straw building, but it must be cosy and free from draughts. Where poultry is continually housed, up-to-date pens should be built to get the maximum results. Plans can be obtained from the Department of Agriculture.

The pig is content to seek shelter in a straw stack, but in the case of a farrowing sow, a properly fitted pen should be provided for best results; there are many good examples in our district.

On no account bunch too many buildings together, yet they should not be separated too widely; each construction should be distinct and outstanding, although it is quite obvious that very few farmers actually have the privilege of wholly improving their farms, as many go on to improved places, and what was good enough for the other fellow is good enough for them. Others are content to carry on where their forefathers left off, and there is hardly one farmer in a hundred who has his farm buildings just as he would desire them. Every farmer should do his best in erecting good farm buildings, for apart from being convenient and pleasing to the eye, they often more than repay the outlay involved if the property is sold, and will frequently realise pounds more per acre on account of being well improved. Good farm buildings in most cases reveal a prosperous farmer and a high producing farm." (Secretary, L. Davis.)

SUTHERLANDS (Average annual rainfall, 10.84in.).
February 7th.—Attendance: 29.

FAT LAMB RAISING.—Mr. W. Schiller read the following paper:—"The production of fat lambs for the export trade is now a factor in the primary industries of the State, and is destined to play a large part in the future progress of South Australia. It is therefore up to farmers to improve the standard of their fat lambs in order to meet the requirements of the overseas buyer. Do not think that the buyer will take whatever type of lamb is offered to him. If the fat lamb trade is to be developed producers must offer the lamb for which the buyer can find a ready sale. The overseas market demands a light-weight lamb, dressing 32lbs. to 36lbs., for which the buyer is prepared to pay a higher price, even if the quality is not quite so good as that of the heavyweight lamb. Naturally the aim of the breeder will be to produce the most profitable lamb under the conditions which obtain in his district.

THE MOTHER.

The ideal mother of the export lamb is either the Longwool-Merino crossbred ewe or the Corriedale. They are more prolific and less liable to parturition troubles than the Merino in lamb to British rams. The lambs mature quickly; the ewes have a decided tendency to produce twin lambs, and can be mated to carry lambs as 2-tooths. When too old for breeding they can be readily sold to the butcher. The only disadvantage is that they do not grow a fleece equal in quality to that of the Merino. It must be admitted that they are bad fencers, and in this district difficult to obtain. Where Merino ewes are to be mated they should be large, plain-bodied animals, from 5 to 6 years old. These animals will produce bigger lambs, and a better percentage. They make good mothers, and are less liable to lambing troubles than 4-tooth maiden ewes. The Merino is essentially the sheep of the country, and the ewes can be obtained in unlimited numbers. It is possible in special cases for farmers to breed their own crossbred ewes, but on a small farm this is not a profitable undertaking. Where the ultimate objective is the raising of fat lambs, it would render unavoidable the simultaneous presence on the farm of small groups of sheep of various grades which, on a small area, would result in confusion and loss. For the beginner, a line of station-bred cast for age ewes is the most suitable. They have generally withstood several cullings, and as a rule make a very even line, whose fleeces are more to be desired than an uneven or nondescript line. Their natural timidity can be overcome by careful and gentle handling.

THE SIRE.

The utmost importance attaches to the appropriate choice of the sire, particularly so when ewes are Merinos. There are three special characteristics which the sire must be expected to impress upon his progeny—early maturity, good bodily conformation, and high quality flesh. The sire must also come from a breed possessing a high degree of prepotency. From the standpoint of quality of meat, the Merino leaves much to be desired. It is long, narrow, flat ribbed, high in the withers, very irregular in top and bottom outline, with poorly developed legs and coarse bone. If Merino ewes are to produce lambs with the desired type of carcass, then there is no better sire than the Southdown. In this district the Dorset Horn is more favoured. The lambs from this cross are well suited to the local market, and owing to their rapid development, command

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

high prices when fat lambs are scarce. The lamb from the Shropshire ram is of irregular conformation, and the lambs have a tendency to wool blindness. The Suffolk produces a very good lamb, but the carcass is not so shapely. The Corriedale ewe is a valuable mother, but the ram is not suitable for fat lambs. The English Leicester must be considered as a ram for fat lambs, but the flesh has a tendency to tallowiness. The size of the fat lamb flock will naturally depend on the amount of pasture available. Overstocking must be strictly avoided, but at the same time understocking will prove a losing proposition. Hand-feeding during the late autumn and early winter will pay the fat lamb raiser handsomely, a good ration for the ewes being 1lb. of oats and 3lbs. of chaff per ewe per day.

GENERAL MANAGEMENT OF THE FLOCK.

Do not limit the number of rams, and British-bred rams will not work if alone. Three rams to 100 ewes is a good percentage. Any ram after he reaches full-mouth cannot be relied upon. Ram lambs from 6 months old will work quite effectively, but this will certainly check their development. Join the rams not shorter than a fortnight after dipping, and leave them with the ewe for 8 to 10 weeks. The ewes should be in good forward condition, and maintained at such right through the gestation period. The best time to start mating is some time in December, so that lambs will drop from about the end of April until the middle of June.

As lambing approaches, the ewes should be put into sheltered paddocks and visited at least twice each day to render any assistance that might be necessary. After lambing, remove the dry ewes from the flock, and give the lambs and ewes the best pastures available. Much benefit will be obtained if a frequent change of paddock is made. Tailing should be done when the lambs are about 2 weeks old. If the lambs are to be marketed when they carry that bloom which is so desirous to the buyers, then it is most important that they have access to a plentiful supply of green fodder right through their lives. When the time comes to market the lambs, on no account handle them by the leg or wool; this causes bruises, and renders the carcass unfit for export. Catch each lamb behind the forelegs and the brisket. When trucking never poke them with sticks." (Secretary, E. Schiller.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Light's Pass ...	18/2/35	23	Addresses—A. Chapman and L. Plush	C. Verrall
Lyndoch	12/2/35	12	"Vegetable Growing," J. Reudiger	J. Hammatt
Blyth..........	25/1/35	10	"The Farm Team," R. Eime	R. Eime
Buchanan	15/2/35	14	Harvest Reports	L. Bell
Koonunga......	13/2/35	15	Address—H. B. Barlow .	H. Mibus
Penwortham ...	30/1/35	12	Paper from *Journal*	A. Jenner

YORKE PENINSULA DISTRICT.

PASKEVILLE.

February 12th.—Attendance: 11.

HARVEST REPORTS.—It was generally agreed that returns were favourable, especially in view of the late seeding and the unfavourable weather that was experienced prior to August. Ranee ranked as the highest yielder, and Burra gained in popularity this year, but several members reported that it shook rather badly. Other varieties that did well were Glueclub, Ford, Waratah and Nabawa. The barley sample was superior to that for the past few seasons, with yields light to moderate. (Secretary, J. Prouse.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Bute	21/2/35	14	Discussion	H. Perry
Brentwood	7/2/35	9	Harvest Reports	J. Boundy

WESTERN DISTRICT.

MOUNT HOPE.

November 20th.—Attendance, 8.

THE CARE OF SHEEP.—Mr. G. Vigar read the following paper:—"Sheep are the most important industry in this district, and they should be handled in a commonsense way. First get your country fenced securely. Have the land securely fenced with a six-wire fence, and if possible water in every paddock. Sheep should not have to travel more than a mile and a half for a drink. The Merino is the most suitable breed for this district; they give a good yield of wool, are also useful for mutton, and quiet to handle. Give them attention all the year round; they should be inspected at least twice a week, and see that the water and feed are always present in abundance, and a look-out kept for blowflies. There is often a heavy loss of sheep through fly. Crutch during March or April, and clean the wool off the eyes; a number of hoggets will die during the year if this is not done, through not being able to see where the feed is, also running into every bush they come to. The best time to shear in this district is during September and early in October. I prefer the blades for shearing, as they do not cut as close as the machines. Care should be taken in getting up a clip, even if it is only a few bales. Make two grades of wool: all the brighter and stronger wool to be marked as AA and the duller and weak wool be marked A. The fleece should be skirted, all the raggy ends removed, and sandy backs taken out. Oddments should be marked; pieces, stains, bellies, table locks as the case may be, and the bales branded and numbered, and a correct statement forwarded to the wool broker. After shearing the sheep should be dipped, using a reliable brand of dip. During shearing cull the flock; first cast for age; mark for sale or killing all broken-mouthed ewes and full-mouthed wethers, and if enough lambs to warrant it, mark any poor quality younger sheep. The best time for lambing is during June. There should then be some green grass about to ensure the ewes having milk for the lambs. Mark the lambs when they are from a month to six weeks old. In order to secure an abundant supply of feed for sheep, top-dress the paddocks with about 60lbs. of super per year. When this is done the Clover soon shows up and takes the place of Barley Grass and Silver Grass. All the country about this district would carry a sheep to the acre if it were top-dressed with 60lbs. of 48 per cent. super per year. This would mean that at a cost of about 3s. per acre the carrying capacity of farms could be doubled. We have a regular and reliable winter rainfall in this district, and the super makes the grass grow during the winter months." (Secretary, J. Vigar.)

ROBERTS AND VERRAN.

November 15th.—Attendance, 16.

FAT LAMBS.—The meeting took the form of an inter-branch visit from the Taragoro Bureau. Mr. J. Crooks read the following paper:—"First obtain suitable ewes, and as Merinos are practically the only breed available, it is necessary to obtain the type. The ewe should be short in the neck and legs, broad in the back, with well sprung ribs, deep in the sides, and plain-bodied. For the sire, I would choose a Southdown or Ryeland. The Southdown is short-legged, short-bodied, and very sturdy of build; the Ryeland is taller, but similar in character, and both types should be ideal for producing the lamb required for the fat lamb trade. One feature of the Ryeland lamb is that it retains its bloom much better than most breeds. The ewes should be in good condition at the time of mating, and kept so, right through the gestation period. Six weeks before they are due to lamb all ewes should be crutched and the wool trimmed away from the udder. Immediately the ewes begin to lamb they should be turned into a paddock set aside for the purpose; a lamb born of a well-nourished and cared-for ewe has an excellent foundation and a good start in life. Have sufficient feed in paddocks, and also for hand-feeding if necessary. If fat lamb raising is to be turned into a profitable business it is necessary to topdress pastures, and to sow feed in paddocks for the ewes and lambs, preferably with barley, oats, and wheat, so that the ewes and lambs can be changed frequently from paddock to paddock to ensure frequent and succulent changes in pasture, which is very necessary to young growing lambs. If one relies on natural grasses for feed, success of a limited nature only can be expected. If fat lamb raising is to be made profitable it requires care, attention, and forethought as to pasture and the needs of the prospective client, for you must be prepared to sell him what he requires and not what you think he should take. His trade is governed by his consumers, and in turn must react accordingly. The time for fat lambs to drop is largely a matter for the individual to judge, as lambs born on greenfeed are far better lambs at birth and make far better growth than those born on dry feed. In conclusion, have the ewes in good condition, have a sufficient number of rams, and when yarding for trucking, handle the lambs carefully. This is where trouble with most rejects starts. Rough handling means badly bruised lambs. Last but by no means least, grow good feed and plenty of it and make some attempt at topdressing natural pastures."

Discussing the paper, Mr. A. Edwards considered if plenty of good green feed was available any breed would grow good lambs and fatten quickly. Mr. A. Cowley said certain types of sheep produced a better type of lamb than another, therefore it was essential to have the right type of ram for fat lamb raising, also to have good young strong ewes for success. Mr. Winters thought Border Leicesters a dual purpose breed, producing a good lamb, and if there were any rejects they could be kept, as the wool did not deteriorate as it did with some English breeds. Mr. C. Marters said it was necessary to have the right type of rams and ewes for success in lamb raising. Feed was also essential; he advised sowing feed as well as natural pastures. Mr. H. Smith said if certain classes of sheep were allowed to become crossed with different types, their wool would not weigh so heavy. He advised members to make sure that this did not occur, and said crossbred lambs were necessary for fat lamb raising, but would not allow any to mature. Pure Merino ewes should be used in this locality. Fencing should be worked out systematically. All fences should be put up permanently, thus saving time and labour. Water was as essential as capital. If no water mains were close he advised scooping for dams. Generally speaking, capital was the biggest handicap.

Developing a New Farm.—Paper read by Mr. E. James:—"Anyone taking up a new block should have, if possible, sufficient capital to purchase a plant suitable to the rough work to which it will be subject during the process of clearing. Choose a site for homestead and outbuildings as near the centre of block as possible, which keeps the farmer within reasonable distance of future paddocks. In making the first clearing, clear a definite shaped paddock, starting at the house, so that permanent fences can be erected as clearing progresses. The implements most suitable are a good disc plough, disc drill and harrows, and for harvest a stripper and power winnower. In this district —which is of the low mallee type—the disc plough successfully ploughs the land and deals with sticks and shoots, and the stripper will reap successfully on any class of land. It is lighter to pull than a harvester. In clearing, roll in spring and burn the following year. If a good, clean burn has resulted, it is quite safe to crop that year, but if through bad weather or thin scrub a bad burn results, fallow instead of crop. Fallow all new land if possible and sow early wheats. The firerake is probably the cheapest implement of the lot, but it is one of the most important in developing the block. Introduce sheep as soon as there is land available; they are a most valuable sideline; they provide meat for the home, proceeds of the wool clip, and the land is improved for wheat-growing." Discussing the paper, Mr. A. Cowley did not agree that the central position was the best for a homestead. There were many things to be taken into consideration, such as water mains; if no water, the most suitable place for dams; also the outlet from the farm to the town or main roads, and fences. After considering these things one could proceed with the laying out of the homestead. He favoured placing the homestead near the main road, especially if a water main was available. Make a rough sketch of all buildings, fencing, &c., and put up permanent structures if possible. He favoured clearing along one boundary first, gradually working away from the homestead. Mr. Crooks (Taragoro) thought the writer's choice of implements good. He favoured clearing 400 acres the first year, 200 sown to wheat and 200 fallowed. He would clear along a main road first. The site for the homestead depended on the water position. Sheep were essential as soon as possible. Mr. Barber said spring time was the wrong time to roll scrub; winter was best. The young shoots got a start before burning, thus giving a second check. He favoured a house in a central position; it saved time travelling backwards and forwards. He thought a dam too close to the house a nuisance. Mr. Whittaker (Taragoro) considered water was as essential as capital. One was no use without the other. He would put his homestead "on a water main" if possible. There was no advantage in building in a central position unless the water could be laid on. Mr. Ramsey said he would make his homestead near a road, especially if water was available. Mr. T. Winters favoured building a homestead as near to a water main as was convenient. He would leave a belt of scrub round a homestead for protection, and build permanent structures where possible. By doing so one soon had something which was an asset. Protect all machinery by building sheds—brush or straw if nothing else was available. Machinery could not be over-cared for. It was expensive to buy and demanded care if one is to succeed. Every farmer should make his farm attractive by planting trees along fences, especially the main entrance. Through the medium of the Bureau farmers had every advantage, and by working with a system and careful observance, one should be able to carry through. Records were essential, book-keeping necessary, and a diary most useful and easy to keep written up. Mr. C. Masters said the position of the homestead depended on the water problem. A saving in capital could be made by working off another block, gradually starting instead of going straight on to a new block. Build a stable and implement sheds as soon as possible. Mr. Smith thought a central position for the homestead was essential. He said water could be laid to the homestead, but it was not an easy matter to move the homestead when once established. He favoured clearing small portions of scrub at a time, and rolling scrub early in winter. Stake fences would serve until permanent ones could be put up. Disc implements were essential. (Secretary, C. Masters.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Maltee	14/2/35	15	"The Grasshopper," A. Edson	E. Schwarz
Kelly	2/2/25	20	Discussion	F. Illman

EASTERN DISTRICT.

LONE GUM AND MONASH.

At the February meeting the president (Mr. W. R. Henwood) was in the chair. Messrs. N. Fotheringham (Manager of the Berri Experimental Orchard) and F. R. Arndt (District Horticultural Instructor) took advantage of the opportunity of bringing under the notice of members the grave danger which was threatening from a further visitation of grasshoppers. It was decided that the committee should take the matter up and formulate some scheme to assist in checking the grasshopper menace.

Messrs. K. B. Hocking and H. March gave short addresses on the subject of the classification of dried fruits, and related some of their experiences in the grades and general chracteristics of the fruit seen by them in various districts.

Our Fruit in England.—Mr. J. O'Callaghan, who has recently returned from a trip to England, commented very strongly on some of the poor samples of fruit seen by him in the sale-rooms. In his remarks regarding citrus, Mr. O'Callaghan commented very favourably on a shipment of Australian oranges seen and tasted by him. There was no doubt as to the quality, but he could not help contrasting the general get-up for the public between our fruit and some he had seen from South Africa, which, although undoubtedly inferior fruit to ours, exhibited in an attractive manner under glass and the glare of coloured lights, and with a neat black band around the fruit, sold exceptionally well.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

There was a large attendance of visitors, including the Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), Messrs. L. S. Smith (Secretary to the Minister), Mr. G. Quinn (Chief Horticultural Instructor), Mr. A. G. Strickland, M.Sc. (Deputy Chief Horticultural Instructor), Mr. E. Leishman (District Instructor), Mr. F. C. Richards (Assistant Secretary Agricultural Bureau), and members of Hills Branches of the Agricultural Bureau, at the Blackwood Orchard on 1st February, when the local Bureau held its annual field day. The Manager of the Orchard (Mr. R. Fowler) conducted the visitors through the Orchard, and explained the various experiments that are being carried out. Mr. Strickland also took the opportunity of discussing with growers the regulations that will be in operation during the forthcoming fruit export season.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

19th January.—Attendance: 15.

GARDENING.—The following paper was read by a junior member of the Branch, Master R. Elliott, and outlines lessons in gardening as taught at the Scott's Creek School:—"We have 11 experimental plots at the school, and it was from work on these plots that I am learning how much more interesting and successful it is to do the work as shown by our teacher. Each plot is exactly the same area, so that it is possible to estimate how much fertilizer is required at the rate of so much per acre. To prevent the goodness from one plot creeping into the other, it is necessary to have a barrier; to do this, paths are made 2ft. wide. On account of the nature of the ground, the hoe helps to keep the moisture in the ground, where it is most easily obtained by the plants, and in this way maximum results are secured from the manure. Before planting the ground is dug deeply. Each pupil has one plot, girls as well as boys. The plots are all numbered, and in each is planted eight different kinds of vegetables, so arranged so that if potatoes are planted in No. 1 plot, No. 1 row, No. 1 row in No. 2 plot would be lettuce. No. 1 plot is planted as follows:—No. 1 row, potatoes; No. 2 row, onions; No. 3, peas; No. 4, cabbage; No. 5, lettuce; No. 6, carrots; No. 7, silver beet; No. 8, potatoes. No. 1 row in No. 2 plot is lettuce; No. 2 row, carrots; No. 3, silver beet: No. 4, potatoes; No. 5, onions; No. 6, peas; No. 7, cabbage; No. 8, potatoes. The other nine are planted in the same manner as No. 2 plot, but with dif-

ferent manures. No. 1 plot has no manure and no rotation. No. 2 plot no manure, but rotation; No. 3, superphosphate and lime, rotation; No. 4, sulphate of potash. The results are about equal. Fairly good. No. 5, nitrate of soda; No. 6, super, sulphate of potash, and nitrate of soda; No. 7, sulphate of ammonia. These three plots are slightly better than the last four plots. No. 8, stable manure. The improvement on this plot against the others can easily be seen. No. 9, green manure. This plot is about equal to No. 8, but the moisture is greater than the other fertilizers or manures, and compared with the manures of the first eight plots, this is the best. No. 10, stable manure and combined fertilisers; No. 11, combined fertilizer, lime, and stable manure. We put 4cwts. of fertilizer per acre on the plots with the exception of No. 8, which has 20 tons per acre. These two last plots stand out as excellent, and are the best we have. In all the plots excepting No. 1 we have rotations, *i.e.*, the last row in the plot this year is moved to the first next year; which means that all the other rows move towards the bottom, at the rate of one row per year. Carrots and onions do well on No. 1 plot, which has no rotation, but cabbages and lettuce and the rest of the plants do much better in the rotation plots than those in the no rotation plots. If ever I take up gardening, I will remember that these experimental plots have taught me that to grow good vegetables, fertilisers and keeping the ground well worked are necessary to grow good crops.'' (Secretary, A. Stone.)

Hills Branches Field Day, Blackwood Orchard, 1st February, 1935.

HOPE FOREST.

February 4th.—Attendance: 14.

Mr. Bevan occupied the chair, and the meeting was devoted to a discussion on subjects of local interest.

The Annual Field Day of the Branch was held at the residence of Mr. Wollaston on February 16th. Mr. Wollaston gave a demonstration of the handling and working of bees. (Secretary, E. Muldoon.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Finniss	18/2/35	8	" Conservation of Fodder," M. Meyer	L. Dunn
Macclesfield	21/2/35	9	Address—A. Smith	H. Ross
Murray Bridge .	25/7/34	7	" Cereals for Stock," A. Beviss	F. Lehmann
Murray Bridge .	22/8/34	6	Conference Report	F. Lehmann
Murray Bridge .	18/9/34	20	Address—C. A. Goddard	F. Lehmann
Murray Bridge .	24/10/34	8	" Bees," L. Pym	F. Lehmann
Murray Bridge .	23/11/34	10	" Problems of the Dairyman," H. Kuchel	F. Lehmann

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying— Care of Milk and Cream Buttermaking Cheesemaking Pigs— Bacon Curing Beekeeping— Honey Horticulture— Vegetable Growing Flower Growing Poultry— Dressing Incubation Rearing Chicks Turkeys Ducks	Home Management— Furniture— Choice Repairing Needlework Knitting Rugmaking Clothing— Choice Repairing Dressmaking Pattern Afternoon Children— Care and Management Cooking— Recipes Recipes for Christmas Lunches Jam Making Fruit Preserving Fruit Drying Fruit, Value of Pickles and Sauces Sweet Making Exhibition of Home Crafts Christmas Gifts Home Nursing	Inter-Branch Visits Competitive Exhibition Flower Show Practical Demonstrations Social Music in the Home Good Reading Hobbies Physical Culture Labor Saving Hints Spring Cleaning Entertainment in the Home.

AUBURN (Average annual rainfall, 23.98in.).
January 25th.—Attendance, 16.

TOWN VERSUS COUNTRY LIFE.—Mrs. Blatchford occupied the chair at the January meeting which took the form of a debate on the above subject. Mesdames Giles, Schmerl and Burfield spoke in support of the advantages of country life. In the course of their remarks these speakers contended that there was more freedom in the country and that the children were healthier and happier. Good fellowship was more in evidence in the country, home life was worthy of the name, and living was cheaper with plenty of meat, butter, milk, cream, eggs, fruit, and vegetables. There was not the hustle and bustle of the city and residents in rural districts were able to lead a more peaceful life. Mesdames Stephen and Kench and Miss Dennison argued in favour of town life. They claimed that in the city, the homes were equipped with many conveniences and labour-saving devices, beautiful gardens could be laid out and attended to without any fear of having to give up the work because of a shortage of water. Facilities for the purchase of home necessities were undoubtedly better and cheaper, the children could be given the best education and there were more organizations for women to belong to and take part in public affairs. With these advantages the city dweller had infinitely more time for recreation and pleasure. A vote taken at the conclusion of the addresses decided in favour of the advantages of country life. (Secretary, Miss L. Dennison.)

BELALIE (Average annual rainfall, 17.71in.).
October 2nd.—Attendance, 40.

BABY'S RIGHTS.—Paper read by Mrs. J. Davies.—"Let me preface my paper by a quotation from Socrates, 'In every work, the beginning is the most important part, especially in dealing with anything young and tender.' The extreme importance of care and system in the rearing of babies is becoming universally recognised; modern mothers are applying themselves more and more to the theory of the upbringing of children in contrast to earlier days, when haphazard methods were used, with a consequent far

greater infantile mortality rate than is the case under present-day methods of care and treatment. The days when baby was fed when he was hungry, slept with his mother, or very often between mother and father are over. Every baby who makes his bow to this world has his rights as has every citizen of the great British Empire.

Pre-natal Care.—Give baby every chance by keeping mother healthy before his birth. She should lead a normal healthy life, walking briskly (not sauntering) at least two miles every day in all weather, thus ensuring fresh air and sunshine and keeping her muscles toned up. She should not lead a life of semi-invalidism, at the same time avoiding over-exertion.

Feeding.—Breast fed is the best fed. No system of bottle feeding can ever give to the mother and child the advantages which both derive from suckling; nothing can rival milk drawn direct from the breast into the baby's stomach, pure, fresh living blood, warm and uncontaminated by germs. If it is impossible to breast feed baby, no pains must be spared to provide the best substitute suited to his own individual needs.

Regularity.—Bring up baby by the clock. He should have regular hours for sleeping, bath, exercise, regularity of action of bowels, and above all regular feeding times with nothing between meals but boiled water and fruit juice. Do not hesitate to wake him if asleep when meal time comes round and do not feed him during the night. A baby will soon become a 'real little clock.'

Fruit Juice.—Give baby orange juice which has been carefully strained, beginning with half teaspoon midday between meals after he is one month old. Prunes stewed without sugar and carefully strained may be given at an early age and are very valuable as laxative.

Fresh Air.—Let baby have plenty of sunlight and plenty of fresh air day and night. Never cover his mouth with anything, not even with muslin. The more baby is out in the open air the more he will thrive. Let him sleep in a room by himself whenever possible, or at least away from his mother's bed in a corner of the room away from direct draughts, but where the air can circulate freely.

Cleanliness.—Immaculate cleanliness in everything, especially with regard to food and utensils, which should be regularly sterilised and kept apart under fly-proof gauze.

Comfortable Clothing.—Clothing should be light, porous, and warm, free from irritating properties, sufficiently loose to allow perfect freedom of limbs and free play for expansion of chest and abdomen, but not so loose as to ruck into folds. Beware of constricting tapes and belts. A binder should be discarded as soon as the cord is healed.

Bathing.—Bathe baby quickly in a cosy corner—no dawdling or playing. Dry him thoroughly, especially about all folds of skin.

Do not give baby a dummy. It is utterly unnecessary. It deforms the jaws, teeth, and palate, and causes saliva to dribble, thus interfering with digestion. Further, it is a leading cause of adenoids. A baby needs abundance of sleep. Proper mothering and handling of a baby are essential for the best growth and development. Every baby should have his mothering time every day. Weaning should commence at from nine to 12 months. Up until then, milk has supplied all his needs, but the time has come when he must learn to assimilate solid foods. At six months he can be given a chicken bone to gnaw to teach him to chew and also exercise his gums. During the 10th and 11th months, baby should be learning to eat, rather than eating solid food. Make all changes very gradually. He may be given a dry crust to nibble at. Prepare these crusts by cutting day-old fingers of bread and drying in oven with door ajar until crisp and lightly brown. Store in airtight tin. After awhile, scrape with butter; these are better than prepared rusks as they are not sweetened. Oaten or barley jelly, prepared by boiling oatmeal or barley for at least two hours and then straining through a fine strainer, makes an admirable 'first solid.' A day's supply can be prepared each morning. Vegetables, baked apple, &c., should all be rubbed through a strainer at first until baby has become thoroughly used to them. Give a raw, ripe apple as part of meal, but do not leave baby alone in case of choking until he has thoroughly mastered the art of mastication. Teach the child to chew by giving solid food, such as crust or bone, at the beginning of meal when he is hungry.'' (Secretary, Mrs. E. Orchard.)

McLAREN FLAT.

December 6th.—Attendance, 21.

Cake Competition.—A Sponge Cake Competition was held under the auspices of the Branch, and the following are the recipes of the winning entries:—*Plain Flour Section—First Prize,* Mrs. Bert Elliott: 3 eggs, ¾ cup sugar, pinch salt, 1 large cup plain flour, ½ teaspoon c. soda, 1 teaspoon c. tartar, ¼ cup hot water; beat eggs 10 minutes, then add sugar and beat 10 minutes. Add flour and rising and finally hot water; bake in a moderate oven 10 to 15 minutes. *Second Prize,* Miss F. Nicolle: 4

eggs, 1 cup plain flour, ¾ cup sugar, 1 teaspoon c. tartar, ½ teaspoon c. soda, 2 tablespoons cold water; beat eggs and sugar well, add other dry ingredients which have been sifted 3 times, then add water and beat lightly; bake 20 minutes. *Cornflour Section—First Prize,* Miss P. Green: 4 eggs, ¾ cup each sugar and cornflour, 1½ teaspoons c. tartar, ¾ teaspoon c. soda; beat eggs and sugar for 20 minutes, then add flour and rising; cook in moderate oven for 20 minutes. *Second Prize,* Mrs. Bick. Elliott: ½ cup sugar, 3 eggs, 1 tablespoon flour, 2 tablespoons cornflour, ½ teaspoon c. soda, and 1 teaspoon c. tartar. (Secretary, Miss I. Nicolle.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

November 17th.—Attendance, 12.

WASHING WOOLLIES AND SILKS.—Paper read by Miss E. Hein:—"To wash silks so that they retain their freshness and colour, make a lather of the very best soap and water. Any chemical will remove the lustre and discolour silks, so add nothing else to the washing water. A garment of undyed silk that has become very soiled may be steeped for a little while in a weak solution of borax and water. To cleanse the silks, knead and squeeze them in soap and water, but avoid hard rubbing. Soiled parts should be rubbed on the palm of the hand with a little extra soap. Rinse the silks in two or three waters of the same temperature as the washing water, and into the last rinsing water add a few drops of methylated spirits. This gives the silk a nice gloss. As a general rule, roll silks to dry in a towel after squeezing out as much water as possible, and iron them while still damp. The washing and ironing of any silk should be accomplished in as short a time as possible. Japanese silk, crepe-de-chene, washing satin, and all soft thin silks, iron while wet. Fuji may be partly dried before ironing, and tussore silk should be dried thoroughly and ironed on the right side. Crepe-de-chene and any other silks with a raised pattern should be ironed on the wrong side. There are five reasons why woollies shrink—rinsing and washing waters of uneven temperature; woollens are left lying about wet; if not stretched into shape before being hung out; if water is too hot and cheap soap powders are used. Wash woollens in two or three lathers of good soap and warm water, then rinse quickly in several waters of the same temperature. Squeeze the woollens in a towel to get rid of as much water as possible before hanging out. It is essential that they dry quickly, so put them in a shady, cool place, where they will get a cool stiff breeze. When they are almost dry, press them on

the wrong side, with a cloth between the iron and garment; then air. When the baby's knitted, crocheted, or Shetland wool shawl has been washed, dry it on a sheet on the floor, or a lawn, with the points of the lace border pinned on the sheet. If the shawl is a very heavy one, it may be thrown over the line, but remember to change the position frequently. To wash blankets mix together 2 large teaspoons of borax and 1 pint of soft water. Put them in a tub of water. When the soap is dissolved, shake the blankets and put them into the tub and leave there overnight. Next day squeeze and knead the blankets, then rinse in several waters. Hang to dry without squeezing. Put the blankets in a windy place, where there is a moderate sun. See that the stripes are hanging perpendicularly to the ground, so that if the colours do run, they will not run into the plain parts of the blankets. Shake each blanket frequently. Some women use cloudy ammonia when washing blankets. It is an excellent solvent for dirt, but blankets are really still so clean when they are put into the wash that there is no necessity for using it. It cannot improve the blanket and certainly will do a lot of harm unless used in the proportions of 1 tablespoon of cloudy ammonia to 1 bucket of water. Ammonia means death to colours.'' (Secretary, Mrs. F. Liebelt.)

January 19th.—Attendance: 20.

Mrs. H. White presided at the January meeting, which took the form of a Biscuit Competition. Eight entries were judged by Mesdames Hartmann and Altmann, who made the following awards:—First prize, Mrs. A. Schubert; second prize, Mrs. F. Liebelt. (Secretary, Mrs. F. Liebelt.)

MORCHARD (Annual average rainfall, 13.59in.)

November 27th.—Attendance, 37.

Rice: the Food of the People.—Mrs. C. Schulz (Hon. Sec.) read the following paper:—Rice is the staple diet of half the people of the world and one of the highest grades of rice is grown in Australia. It is important that food for human consumption should be produced under hygienic conditions, and this is true of the rice grown and milled in Australia. Whilst no article of diet can claim to possess all the properties of an ideal ration, rice embodies them to a greater degree than any other meat, cereal or vegetable. It is so easily digested that doctors recommend it as the best food for children. It can be used in a host of ways for soups, stews, savouries, biscuits, cakes, etc., and it is very beneficial for invalids. The following recipes have been tested and their worth proved. *Rice Water*: 3ozs. rice, 1oz. raisins, 1 quart water and salt. Wash the rice three times and place in a stew pan with 1 quart of water and the raisins; boil gently for ½ an hour, strain through a sieve and drink when cold. *Rice Gruel*: 2 teaspoons rice, ½ pint milk, 1 teaspoon sugar, salt, cinnamon, brandy or sherry. Wash the rice and add boiling milk; simmer for 15 minutes stirring all the time. Add sugar, salt and a pinch of cinnamon or 1 tablespoon of sherry or brandy. *Invalid's Drink*: 3ozs. rice, 1oz. sugar, 1 tablespoon or raspberry or other flavouring, salt. Wash rice, boil in 3 pints of water until reduced to 1 quart. Strain, sweeten, and flavour with essence. *To Boil Rice*: 1 large cup of rice, 1 teaspoon salt, juice of ½ a large lemon in a saucepan containing 2 or 3 quarts of boiling water. Wash the rice in 6 waters; put salt and lemon juice in boiling water, then add rice. Boil fast for 20 minutes or until a grain tested between the fingers feels soft. Strain through colander, allow cold water to run over rice for a minute or so then place the rice in a colander over a saucepan containing boiling water. Keep water boiling and cover rice which will be ready for use in about 15 minutes. Always use lemon juice. *Sultana Cake*: ½lb. each butter, flour (plain), sultanas, sugar and ground rice, 1 teaspoon baking powder, 3 eggs and a little milk. Beat butter and sugar to a cream, mix powder in flour and add gradually fruit. Beat eggs thoroughly, add milk, beat all 5 minutes. Bake in moderate oven 2 hours. *Rice Biscuits*: ½lb. each flour, sugar, ground rice and butter, 1 teaspoon baking powder, 2 eggs and salt. Rub butter into flour, sugar, ground rice and baking powder; add eggs. Roll thin and cut with cutter. *Short Cakes*: 5ozs. butter, 6ozs. castor sugar, 4 eggs, 4ozs. flour, pinch of salt, 2ozs. rice flour, ½ teaspoon baking powder. Cream butter and sugar, add eggs one at a time, beating in well. Sift in the flour, rice, flour, salt and baking powder. Stir lightly until well mixed. Put in patty pans and bake in a moderate oven about 10 minutes. These cakes keep very well. *Rice Cheese Cakes*: Raspberry jam, pastry, 2ozs. butter, 4ozs. sugar and ground rice, 2 eggs, lemon peel and salt. Line patty tins with paste, put into each 1 teaspoon of raspberry jam and cover with curd made after the following directions—melt butter, beat with it the sugar, ground rice, lemon peel and eggs. Bake about 10 minutes. *Spice Cake*: 2 eggs, ½lb. plain flour, ¼lb. rice flour, 1 teaspoon each ground cinnamon and ground allspice, salt, ½ cup milk, 4ozs. butter, 5ozs. brown sugar, 1 tablespoon golden syrup, 1 level teaspoon carb.

soda dissolved in dessertspoon boiling water. Sift flour, rice flour, allspice, cinnamon, and spice. Cream butter and sugar, add eggs one at a time and beat in well. Add milk, then syrup, soda, and boiling water mixed. Add flour, etc., and mix lightly. Bake in a moderate oven 35 to 45 minutes. *Tasmanian Raspberry Buns*: 1 cup rice flour, 1½ cups flour, 1 teaspoon baking powder, ¼lb. each butter and sugar, raspberry jam, 1 egg, milk, and salt. Sift flour, rice flour, and baking powder. Rub butter into flour and sugar and mix into a fairly dry paste with the yolk of the egg and a little milk. Divide into small balls and roll each one out flat. Put ½ teaspoon raspberry jam on each round and close over the bun. Brush with white of egg and bake on a greased tray in a rather quick oven from 10 to 12 minutes. The buns will crack as they bake and show the jam. *Christmas Cake*: 6ozs. each brown sugar and butter, 8ozs. S.R. flour, ½lb. seeded raisins and sultanas, 4ozs. rice flour, ¼lb. each cherries and almonds, 3 eggs, salt. Beat butter and sugar to cream add eggs well beaten, then alternately sifted flour and fruit. Pour into prepared tins which must be lined with 2 thicknesses of brown paper and one of white. Bake 2 to 2½ hours in a moderately hot oven. *Rice Rocks*: 2 eggs, ¾ cup of sugar, 1 cup sultanas and peel, 1 level teaspoon soda, ¼lb. butter, ½lb. ground rice, 6ozs. flour, 1½ teaspoon cream of tartar, milk and salt. Cream butter and sugar, add eggs, then dry ingredients and fruit. Mix with milk. Drop spoonfuls on a cold tray and bake.

NELSHABY (Average annual rainfall, 17in.).

January 17th.—Attendance: 14.

VEGETABLE DYEING.—Mrs. Pearce read the following paper:—"Vegetable dyeing can be very interesting if one has the material at hand with which to experiment, but this district has not much from which to choose. Brown colours, ranging from nigger to the palest shades of fawn, can be obtained from the green husks of walnuts. The brown skins of onions, when boiled, will produce a rich yellow. Boxthorn berries also yield a vivid yellow. Wattle bark can be used to produce many shades of grey; other dies can be made from lichens, St. John's wort, quondong, and other wild shrubs. For the amateur, chemical dyeing is most satisfactory if a reliable dye is used. There are two methods by which dying can be done—by boiling the material in the dye bath, or rinsing in cold water dye. The former method is necessary if woollens or other heavy materials are to be dyed, or if a dark shade is required. To prepare the dye bath:—Dissolve the dye with boiling water in a small basin, and strain through a cloth so that it will be free from any residue. Put the solution into a vessel large enough to contain the material, which must be thoroughly immersed in the fluid, and yet leave ample room for stirring. The latter must be done continually to prevent spotting. Do not use an iron vessel, or it will leave stains on the material. Any material that is to be dyed should first have any grease marks removed, and be washed in the usual way, then put in a bath whilst still wet. Commence with the bath almost cold; the colour goes into the fabric more evenly at a low temperature, and does not spot or streak. Then raise the temperature gradually to boiling point, and simmer until the desired shade is acquired. If very dark shades are wanted, then the material must be left in the bath until the liquid is cold. Lift out the article when the desired shade is reached, and rinse thoroughly in clean, cold water, using warm water for woollens. Hang on the line dripping wet, and as free from folds as possible. Unless dying the material its original shade, it is advisable to remove the old dye, and this is particularly necessary when it is desired to dye the article a paler shade than the original. Some silks are difficult to dye, but fair results can be obtained if they are lightly soaped before putting in the bath. Old white bedspreads can be dyed, and make very attractive sofa covers or curtains; the brocaded designs look very nice when coloured. Faded stockings can be made to look like new if a little dye is added to the last rinsing water. Rugs and carpets can be brightened by first beating them clean with warm water and soap. While the carpet is still moist, brush in the hot dye solution with a scrubbing brush, going over it twice to get an even shade. With a little practice, shade dying can be done, and is especially suitable for curtains. For light and delicate shades, cold water tinting is preferable to the boiling method. It is advisable to dissolve the dye, strain through a cloth, then bottle and cork tightly for future use. By adding a few drops of the dye to the last rinsing water one may obtain good results. Dying is invaluable for renewing articles which would otherwise be discarded." (Secretary, Miss T. Franks.)

YURGO.

December 12th.

The December meeting was held at the residence of Mrs. E. Easton, when a paper, "Sport for Women," was contributed by Mrs. N. Easton.

POTATOES AND THEIR USES.—A paper on this subject was read by Miss J. Kelly at the January meeting:—"The potato lends itself to the preparation of many wholesome dishes. It is cheap and nourishing, and a valuable standby when green vegetables are scarce. The potato, in addition to its high starch content, contains two of the known vitamins. If the full vitamin and mineral content is to be obtained, they should never be peeled before cooking. *Baked Brown Jackets.*—The most elaborate dish cannot be more delicious than a perfectly cooked potato baked in its jacket. Select large, plump tubers of even size, and scrub them with a stiff brush; prick them all over, and, if liked, they can be soaked in cold water for half an hour. Bake in the oven for 1½ to 2 hours, according to size and the heat of the oven. Test with a skewer; the skin will be brown and slightly loose and the inside floury and crumbly. They may be peeled and mashed in the usual way, but if split open and spread with butter and lightly sprinkled with pepper and salt are very tasty. Tubers cooked in hot embers are even more delicious, and are relished by young and old alike. The inventive cook can improve many a dish with the aid of the baked brown jacket. The usual method is to scoop out the floury interior and mix it with a variety of ingredients. The mixture is then put back into the brown shell and heated and browned again in the oven. *Fillings.*—Mash together the floury potatoes, chopped parsley, and a little finely chopped bacon or ham, with salt and pepper to taste. Fill the cases; sprinkle the tops with bread crumbs and a dab of butter or bacon fat. Bake about 20 minutes. (2) The floury potatoes, grated cheese, a dash of cayenne, mustard, salt, and a little butter. Sprinkle the top with grated cheese before baking. (3) The floury potatoes, finely chopped nuts, a little butter, the yolk of an egg, pepper, salt, and a spoonful of milk or cream. *Boiled Potatoes.*—If the potatoes must be peeled before cooking, do it carefully, and either steam or cook them in just enough boiling water to prevent burning. By the time they are done the water has boiled away, leaving the potatoes full of good elements. If the practice of boiling in a lot of water is preferred, after draining, put the saucepan back on the stove without the lid, and shake until the potatoes are dry and crumbly. Mashed potatoes are lighter and much more fluffy if done in this way. *Potato Chips.*—These are very easily prepared, and can be managed without any special equipment. All that is required is a deep frying pan or a widemouthed, heavy saucepan. Heat sufficient clarified dripping to cover the chips. While it is heating peel the potatoes and cut them into strips about 3in. long and about ¼in. square. Rub in a clean cloth to absorb surplus moisture, and as soon as a faint blue smoke rises from the fat drop in the chips and cook for 4 or 5 minutes. Lift with a large fork or egg slice, and when the fat ceases spluttering and appears smoking hot return them to the pan and cook for 5 to 10 minutes, or until a golden brown colour. Drain on clean, crumpled paper, sprinkle with pepper and salt, and serve at once with a grill or fried fish. A frying basket is convenient for lifting out the chips and putting them back into the hot fat. Potatoes can also be used in cold salads. Boil and let cool, then peel. Recipe.—Line a bowl with lettuce leaves; then place alternate layers of par-boiled onions, green peas, and grated carrot, and serve with mayonnaise.

FRUIT AND ITS USES.

[*Paper read by* MRS. A. CURTIS *at a recent meeting of the Wirrabara Branch.*]

The word fruit as spoken in everyday speech is a misnomer, or partially so, because the words fruit and vegetable are used to imply different things, whereas the dictionary and encyclopaedia term both as fruits. When the female organs of a flower are fertilised the most important result of the process is the production of a seed, but usually the ovule from which the seed develops is not the only part of the flower to be affected; the seed vessel or ovary which is frequently stimulated to fresh growth and modification and even the part of the stalk receptacle on which are inserted the organs of the flower may be caused to take on a new appearance or structure. The total result of all three processes is a fruit. This conception of the fruit causes us to include under the term objects like the tomato and marrow, more generally regarded as vegetables, or like the grain or corn, usually termed a seed.

Fruits are classified in the first place according as they open at maturity to liberate the contained seeds or not. Those which open are variously termed capsule, such as the legume or silique. A capsule is a dry, many-seeded seed vessel, such as the Foxglove, the legume a seed vessel of two valves like the Pea or Bean.

Silique, the long pod or seed vessel of such cruciferous plants as Wallflowers or Mustard, the two latter being in the term pod. The distinction rests on the number of vessels in the fruit and the manner in which the latter open. Fruits which do not open may be either dry or juicy. The dry fruits are termed Nuts, different types being recognised. But certain dry fruits, although they do not open to liberate their seed, break up into distinct parts; such are the fruits of the Carrot family and the Marrow.

The juicy fruits are of very various structure. In the berry, the whole wall of the seed vessel is fleshy, such as the Gooseberry, Orange,-Tomato. In stone fruits, known as the Drupe, which means a stone fruit, such as the Cherry or Plum—a fruit in which the outer part is fleshy, while the inner forms a stone with a kernel. In the Apple and Pear, the fleshy part is the receptacle enclosing the root of the fruit, while in the Strawberry the fleshy part is again the swollen receptacle, this time bearing numerous small fruitlets on its surface.

The Fig is an example of an aggregate fruit, developing not from a single flower, but from an inflorescence. In some cases, a fruit is formed subsequent to fertilization, but without seeds, such as Sultanas, Raisins, and Bananas, while in the Fig and Seedless Apples, no fertilization takes place. Of great interest are the adaptions shown by fruit for securing dispersal of the seeds. Fruits which open frequently do so with considerable violence and scatter the seed. Examples are the Whin and Broom, the pods of which may be heard exploding on a warm summer day.

Frequently the fruit is provided with wings, by means of which it is kept floating in the air, and may drift to a considerable distance, such as the Ash, Elm and Maple, while in the Dandelion and Thistle family the fruit is provided with a tuft of hair, which serves the same purpose. The Burrs have hooked hairs which hang on to passing animals. Finally there are those fruits classed as fleshy fruits which form the food of birds and other animals, the seed passes unscathed through the animal and is deposited at a spot distant from its parent.

The uses of fruit will be dealt with in the following order:—Fresh fruits, dried fruits, preserved fruits, jams and jellies, then sauces, and pickles.

The best possible use of fruit is just as Nature provides it. There is nothing more appetizing, enjoyable, and wholesome than to pick ripe fruit, fresh from the tree, and eat it. Fruit that is reasonably fresh should be in every home, not only one day a week, but all day and every day. Far too many homes consider fruit a luxury, but the same homes probably provide quite a number of shillings per week for the family to spend on sweets. If that same amount was spent on fruit, the family would be much better off, both monetarily and physically.

Parents should encourage children from earliest infancy to spend their pennies on fruit instead of so many sweets. Children need plenty of sugar, but all fruit contains sugar as well as vitamins and minerals which are so essential to health. Fruit in any form—that is wholesome fruit—dried fruits, preserves, jams, &c., are far better than no fruit at all.

DRIED FRUIT.

Most kinds of fruit can be dried, and in this form, fruit can be stored from times of plenty until there comes a time when fruit is not so plentiful. Fruit that is well dried is the nearest akin to fresh fruit, it still contains the fruitose, vitamins and minerals; perhaps in a lesser degree than fresh fruit; but children will never become fruit hungry who have a box of dried fruit to dip into. Dried fruits need thorough mastication, and the hearty chewing is good for the development of teeth and jaws. In homes of modest circumstances, to purchase dried fruit would be beyond their means, but in the fruit season the market is often glutted and fruit becomes very cheap, then is the chance to dry fruit cheaply. After all, the only necessity for doing it is plenty of bright sunshine. A handy tray for small lots of fruit can be made out of 2 yards of bird netting, nailed on to two long, strong but light pieces of wood, with a short crosspiece either end. This can be placed on 2 boxes in a position where it gets the benefit of the sun all day and is easily covered or carried under shelter at night.

Currants are placed on the tray just as they come from the vine, place a tarpaulin or sheet under the tray to catch them as they dry. Grapes need to be plunged into a hot lye of caustic soda; about 2 level tablespoons to 4galls. water, take out and plunge into cold water, then spread on tray. This same treatment is used for prunes and plums. Apricots, peaches, and pears are fumigated with sulphur, but for home use, if they are just cut and spread out in the sun with a little care and attention they can be dried quite nicely, they will go dark and not have such a nice appearance but are none the less wholesome for that. Last season I used quite a lot of fallen apples for drying, just cutting out the cores and any bruised pieces, not peeling them and they are quite a success. The feel of fresh stewing apples seems coarse and unpalatable, but on the dried apples it is not noticeable.

Figs are another fruit that are quite a success, just cut and spread in the sun, they are beautiful for use in cakes and mince fruits. In cooking any dried fruits it is best to use as little sugar as possible, sweet apples and pears can be cooked without the addition of sugar. Apricots and plums that are very sour can be improved by thoroughly boiling in water to which has been added 1 teaspoon of carb. soda, pour this off and add fresh water and sugar and they do not need nearly so much sugar.

Preserved Fruit.

I prefer preserving to jam making, because it takes less sugar, and the fruit does not have to be heated to such a high degree and therefore must be more wholesome as well as more economical. I use a Fowler outfit, following the instructions to the word, if not to the letter. The length of time given for cooking is not long enough, it leaves the fruit too firm, but the instructions are for the best appearances, and if treated longer it rises in the bottles.

For our own use, I do not peel quite a lot of the fruit. Pears are merely cut in halves, bottled with the stems and cores and the russet brown patches on the skin leave nothing to be desired in appearance and have a beautiful flavour. The skin is not coarse, and there is very little waste from the core. Modern methods of cooking are inclined to err too much on the fineness of foodstuffs, discharging roughage that would often be beneficial.

This method also saves many weary hours of peeling. The early varieties of peaches also do very nicely without peeling. Referring to the light kinds of peaches; Fowlers do not recommend preserving these. as they are much softer than the yellow peaches, and are inclined to make the syrup milky, but when possible I include white peaches in my collection.

Jams and Jellies.

This is another form of preserving fruit, but it needs more sugar to make good jam than to make good preserves, therefore, it is not so economical, nor is jam as wholesome a form of storing fruit, as that of preserving, because in the latter the fruit is not heated to such a high temperature nor maintained at it for such a long period, and therefore, contains more of its natural minerals, &c. Nevertheless, jam carefully made can be, and is very wholesome food. Fruit for jam should be sound and firm and of even ripeness it is best to sort the fruit, putting aside that which is too hard, using the ripest first, but it should not be too ripe; over ripe fruit does not make the best jam. Wash the fruit and drain carefully and prepare in the accustomed manner according to what ever kind of fruit is being used, weigh and put into jam pan or copper, and before putting on the fire, pulp the fruit thoroughly, using a heavy jam stick or well-washed hand, place on fire and bring to boil. Boil until skins and fibre are tender, or if pressed with the back of a spoon against the jam stick the fruit will mash after about 1 hour's boiling. Now add sugar and bring to boil again as quickly as possible, stirring constantly to prevent burning. Test occasionally and when the right consistency, in about 1 hour, bottle as soon as it has gone off the boil, and seal immediately. Bottles or jars should be scrupulously clean and warmed in the oven to avoid cracking when the hot jam is poured into them.

The amount of sugar varies according to the variety of fruit. I seldom use more than ¾lb. sugar to the lb. Apricots, Peaches and Sweet Plums, ¾ sugar to 1lb. fruit;

Dark Sour Plums, from 14ozs. to 1lb. sugar to 1lb. fruit; Pears 10ozs. sugar to 1lb. of fruit; Figs, ¾lb. to 14ozs.. sugar to 1lb. of fruit; Quinces or any other fruit that needs the addition of water, ¾lb. sugar to every lb. of fruit, ¾lb. sugar to every pint of water added. Do not waste time peeling quinces, the peel boils perfectly and also adds to the jelling of the jam.

It is a waste of time to try and wash quinces, for cleaning off the fluff, tie a large duster firmly around the right thigh when in a seated posture, and rub the quinces on this. Quarter and core (the core makes the jam jell better), cover with water and boil until well pulped, then add sugar and boil until the desired colour. Figs are the one fruit that I do not wash. If necessary, wipe with a damp cloth and be sure they are not picked after a shower of rain, they need to be perfectly dry as there seems to be less likelihood of fermentation.

TESTING.

The methods of testing are many and varied, judging by the advice given in many periodicals and papers, and so far as country women are concerned, the only difference is one method may outdo the other. A small portion of jam must be cooled to see if it will jell satisfactorily, but to get cool quickly before the jam on the fire has boiled too long is the outback woman's problem with the thermometer in the kitchen soaring over the 100 degrees. For many, the water bag must suffice, some may have a cool safe, others a cool spring, the more fortunate may have an ice chest, but use whatever means are available. Get a saucer as cold as possible, place a teaspoonful of the hot jam on this, stand it in a cool place, in the draught of a southerly window, or float it on the water in a waterbag. When it is thoroughly cooled, it should have developed a skin, if the saucer is tilted sharply the skin should wrinkle, the stiffer the skin and the more distinct the wrinkle the better the jam will set. This last season I have made into jam just over 4lbs. short of 4cwts. of fruit and so far there is not a sign of any fermentation.

The main essential for a good setting in jams and jellies is the pectin contained in most fruits, some much more than others, and the greater the proportion of pectin, the more sugar needed to get a good jell. Lemons and some varieties of Plums contain a higher percentage of pectin, while in some of the sweeter fruits, such as Pears and Strawberries there is very little pectin. In the Lemon it is not the flesh or the skin, but rather the pith that contains the most pectin. The fruit juice should be tested for pectin, before adding the sugar, then add the sugar according to the test. If lacking in pectin, use less sugar than usual. If a fair amount of pectin, then add the usual amount of sugar. If rich in pectin then use more sugar, up to 1¼lb. to 1lb. of fruit. Fruit a little on the firm side usually contains more pectin. The method for testing is as follows:—Pulp the fruit thoroughly and boil well, dip a teaspoonful of the juice into a glass, add 3 teaspoons of methylated spirits, shake together and if the juice congeals into a firm lump and holds together this is a high pectin test, if the juice forms two or three lumps this is a fair percentage and if there are quite a number of small lumps, this shows a poor pectin test.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Clare	2/2/35	64	Social Afternoon	Mrs. H. Pollock
Pinnaroo	7/12/34	20	"Jams and Jellies," Mrs. Bonnin	Mrs. F. Atze
Wasleys	7/2/35	31	"A Trip to Queensland," Miss Braun	Miss J. Braun
Rendelsham ...	6/2/35	8	Discussion	Mrs. Z. Bignell
Balhannah	20/2/35	14	"Shirt Making," Mrs. Nolan	Miss D. Spoehr
Kangarilla	21/2/35	10	Discussion	Mrs. M. Steer
Auburn	22/2/35	40	Social Afternoon	Miss L. Dennison
Boor's Plains ..	7/2/35	—	"Dressmaking," Miss B.	Miss L. Stanway

// THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. APRIL 15, 1935. No. 9.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

Dairying, at Mount Barker, Thursday, May 9th (P. Wise, Secretary).

River Murray, at Moorook, Thursday, June 20th (S. Perkins, Secretary).

Upper North, at Booleroo Centre, Wednesday, July 17th (Wepowie Branch, E. C. Roocke, Secretary, Booleroo Centre).

Hills, at Lenswood, Thursday, August 22nd (B. F. Lawrance, Secretary).

Murray Lands (East), at Alawoona, Thursday, October 3rd (A. J. Pengilly, Secretary).

Fruit (Non-irrigated), at Lyndoch, Tuesday, November 5th (J. S. Hammat, Secretary, Williamstown).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Oats on Weedy Stubble Land.

The Supervisor of Experimental Work (Mr. R. C. Scott, R.D.A.), who was asked by a member of the Hartley Agricultural Bureau if a crop of oats would give a profitable return when sown on a very weedy paddock which grew a wheat crop the previous year, says the success of a crop of oats planted on a weedy wheat stubble depends entirely upon the seeding conditions. Oats are just as liable as wheat to be crowded out by vigorous weeds, and therefore unless these weeds can be destroyed before planting the oats the crop is not likely to be satisfactory. On the other hand, should early rains be recorded, as has been the case this season, resulting in the germination of the weed seeds, and subsequent destruction of the plants by tillage, a good stand of oats can be anticipated. However, should the rains be delayed until it is time to seed the oat crop, the planting of weedy land is not recommended.

Concrete Floor for a Chaffhouse.

In the course of a reply to a correspondent at Lameroo, who asked how to put down a concrete floor in a chaffhouse, Mr. T. A. Macadam (Lecturer in Building Construction at the School of Mines) says:—

Clear away all debris from the area proposed to be covered with concrete and see that the soil is firm and dry. Ram if necessary. The floor area should then be divided into sections approximately 4ft. x 5ft. wide, and no longer than 10ft. in the other direction, that is to say, each section will be approximately 10ft. x 5ft. The various sections can be separated by strips of wood fixed to pegs driven into the ground. The strips of wood should be firmly held in position so that the strength of ramming the concrete can be withstood. If the soil is firm where the concrete is going to be laid there should be no necessity for reinforcing rods. If, on the other hand, there are several pockets of soft soil, it would be advisable to place ⅜in. rods at 6in. centres each way, the rods being laid 1in. from the underside of the concrete floor.

The concrete is mixed in the following proportions:—Four parts of metal (¾ screenings), 2 parts of sand (river or pit), 1 part cement. Mix the materials thoroughly in their dry state on a clean hard surface, then add sufficient water to moisten them and see that the minimum of water is used. Thoroughly mix after water is added until the mix is moistened evenly. Place the concrete in alternate sections, and ram well into position. Trowel the surface of the concrete, and if a smooth finish is desired, dust smooth cement on the top when the concrete has partially set.

Keep concrete damp for at least 10 days. Before filling the intermediate sections place a piece of tarred paper against the edges of completed sections, to form a joint between the new and completed work. The joint will prevent all contraction and expansion between the adjoining sections. Four inches thick should be sufficient for the floor if the soil under floor is good.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of Bulletin No. 83, "Experiments on Inbreeding of Poultry." Price 1s.

Bulletin No. 88, "Brown Rot Diseases of Fruit Trees." Price 1s. 6d. These Bulletins are published by the Ministry of Agriculture, England.

Circular announcing the Second International Congress of Rural Engineering, which will be held under the patronage of the Spanish Government at Madrid from 26th September, to 3rd October, 1935. Further details can be had on application to the Secretary: Mr. E. Aranda Heredia, 10, Amandes Vives, Madrid (12), Spain.

"Journal of the Institute of Agricultural Science," published by the Australian Institute of Agricultural Science. Secretary, A. J. Vasly, B.Sc., Werribee, Victoria. Membership of the Institute is open to University Graduates. Subscription, £1 1s. per

HORTICULTURAL INQUIRIES.

[Replies supplied by A. G. STRICKLAND, M.Sc., Deputy Chief Horticultural Instructor.]

Apple Tree with Split Trunk.

Lameroo asks, "How to treat a 15-year-old apple tree, the trunk of which is badly split?" *Reply.*—The best means of dealing with the trouble is by putting a bolt through the split portion. Before drawing the split together by means of a bolt, the exposed wood and inner bark should be trimmed to a fresh living surface so that when the two surfaces are made to meet, there will be an opportunity for them to heal together. After drawing the two portions of the trunk together, anoint the exterior of the treated part with grafting wax, or a bituminous compound, such as "Colas." If the latter is used, care should be taken to prevent the material running down between the two joined trunk portions, as in such case, the knitting of the two sections may be prevented.

Dropping of Young Citrus Fruits.

The same correspondent reports an orange tree, the fruits of which drop off when small.

Reply.—The shedding of superfluous young fruits is a natural process with most kinds of fruit trees, as such trees often produce far more fruits than the tree is capable of bringing to maturity, or are necessary for the maturation of a commercial crop. It is presumed that this query has reference to that excessive shedding of young fruits which sometimes leads to reduced yields.

A number of factors influence the abnormal shedding of fruits at the stage mentioned, but usually the occurrence is due to adverse climatic conditions which bring about water deficits or to nutritional deficiencies under certain climatic conditions with low humidity and high temperatures; the water loss through leaves may be greater than the amount which the roots are able to supply, even though the soil be thoroughly moist. Under such circumstances a weakening of the attachment between the tree and its young fruits may occur, with consequent excessive shedding.

From the nutritional standpoint the most common contributing factor to excessive fruit dropping is lack of available soil nitrogen during and subsequent to fruit setting. There is, in fact, some evidence that when the effects of heavy water loss and nitrogen deficiency go hand in hand shedding increases.

Where excessive dropping occurs it is advisable to use a nitrogenous fertiliser such as sulphate of ammonia just prior to blooming, and to see that the soil at no time lacks water. The incorporation of organic matter under green crops will result in improved water holding capacity and to some extent overcome any undue water deficiency.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

"South-East Conference".—Have experiments conducted by the Department of Agriculture conclusively proved that it pays to give sheep mineral licks other than salt in farming areas where superphosphate is used for cropping and top dressing?

Reply.—From 1929 to 1931 an experiment was conducted at Dismal Swamp in the South-East by the Division of Animal Nutrition, to determine the extent of benefit which supervened on offering various phosphatic licks to sheep grazing on an area where the soils are low in phosphorous, and to contrast this with the growth and wool production of similar sheep grazing on immediately adjoining country which had been topdressed wth superphosphate.

The results showed that the animals consuming the phosphatic licks experienced little or no benefit and that neither their wool production nor growth rate was significantly increased above that of identical animals running on the same areas and receiving only a supplement of salt. On the other hand, the animals that were run on the top-dressed pasture showed much more marked increase of growth rate and productivity. This improvement was concluded to be due to the improvement in the protein content of the pastures brought about as the result of top-dressing.

While (as Mr. Marston, Acting Chief of Division of Animal Nutrition), points out it is impossible to generalize from the results of one experiment, it would from this experiment appear that the phosphorous requirements of sheep are comparatively low, that they are not benefited by access to phosphatic licks, and that it is much better to apply the phosphate to the soils and thus bring about an improved supply of protein in their feed which is the more necessary thing to ensure satisfactory growth and wool production.

"Lameroo" asks, (1) *treatment for pig that is continuously rubbing itself, and* (2) *how to treat warts on a cow's teats?*

Replies.—(1) The trouble is probably dietetic. Wash the pig all over thoroughly, using a good soap and warm water in which has been dissolved a little washing soda; then dry as thoroughly as possible. Give the animal a dose of 2ozs. of Epsom salts (either as drench or well diluted in milk or thin swill) followed by 10 grain doses of photographer's Hypo mixed in the food daily for a few days. If possible allow a daily run out on green feed. (2) Any warts that are pedunculated may be snipped off at the base with a pair of sharp scissors, and the bleeding cut surface then cauterized with a pencil or stick of caustic. If the warts are flat and cannot be dealt with in this way, they should be treated by first scrubbing well with a weak solution of washing soda to remove all surface scale, &c., and to soften them. If not numerous they can then be cauterized carefully with a caustic pencil, but if too numerous for this treatment to be adopted, rub a little castor oil into them for a few days after each milking.

"Lameroo" reports 2-year old filly with offensive smelling discharge from the nostril.

Reply.—The indications are those of putrid decomposition taking place either in some portion of the nasal passage itself, or in one or another of the structures of the head closely assocated with it, for instance, the bone at the back of the nasal passage or the sinus of the head connected with that passage may be infected. In the latter case, this might be due to a decaying upper molar tooth on that side of the mouth. The case is really one for examination by a properly qualified veterinary surgeon, who could determine the necessary treatment as the result of his examination. All you can do in the way of "home treatment" is to give repeated inhalations of steam medicated with eucalyptus or turpentine. This is best carried out by using a nosebag into which a

couple of double handfuls of bran are put. Some boiling water which has been medicated with a teaspoon of eucalyptus or turpentine is then poured on to the bran to wet it thoroughly and a piece of folded sacking or cloth is placed on top of the wet hot bran to prevent the horse's nostrils from coming into contact with it. The nosebag is then adjusted over the horse's nose.

Secretary, Bugle Agricultural Bureau, reports filly with growth on upper eyelid.

Reply.—It is presumed that the growth is from the skin-side (not inside the eyelid) and if so will be a greyish coloured wart-like mass. This can be removed by tying a piece of strong thin cord or string tightly at the base of the growth and then cutting through on the growth side of the ligature with a sharp knife. If there is any haemorrhage, it can be controlled by applying a hot iron lightly to the bleeding surface, or by using a caustic pencil (silver nitrate). It would be better to leave the removal until the autumn when the weather is cooler.

Secretary, Agricultural Bureau, Kyancutta reports death of foals—off feed, severe scours, heavy breathing, and high temperature.

Reply.—The symptoms exhibited and the result of post mortem examination definitely indicate that the trouble is associated with digestive derangement. In my opinion the cause of bowel derangement is due to the food supplied containing too much indigestible matter.

Local conditions during the past season have been abnormal and possibly, owing to the grasshopper invasion, the livestock have had to subsist on food which has been spoiled or had much of the nourishment in it removed. Also the danger from taking in sand cannot be overlooked.

The analysis of food taken from the stomach would be of no advantage as any growth of bacteria made from it would be too mixed to make possible any diagnosis as to a specific bacterial cause. In addition, the symptoms exhibited are not suggestive of a poison being the cause.

Treatment.—Owing to seasonal conditions and probably the financial state of owners, it is most difficult to give practical advice that can be carried out.

In the first place young stock require good nutritious food, such as good quality hay chaff, fed with concentrates such as bran and oats (preferably crushed). Hay cut late with grain well formed in the heads is on the indigestible side and there is also the danger of the young animal becoming "foundered." Cocky chaff is too irritant and would cause scouring, and bran, though a good food, needs to be given with other concentrates such as oats and linseed.

Medicinal Treatment.—Can only be effective in stopping the catarrh set up in the bowels if given early, and should be in the form of an oil drench, such as:—Take castor oil and olive oil, 2 to 3 ozs. of each, for foals 3 to 5 months old, or raw linseed oil, 6ozs.

At the same time, all rough food should be stopped and for three or four days until scouring ceases, the animal should be given milk and eggs or flour gruel. Then place on a diet of good quality hay chaff with crushed oats and bran and keep off grazing on sandy ground.

Secretary, Agricultural Bureau, Ramco, reports heifer giving milk before she was in calf.

Reply.—This is not uncommon and the cause is not understood, though it is thought to be due to the absorption of a substance (ahormone) sereted by one of the ductless glands of the body such as the ovaries. In some cases, other cattle sucking the teats will cause a milk flow.

CORRECTION.

On page 916 of the March issue, under "Veterinary Inquiries"—"Parasitism in Sheep"—the fourth line should read: Water 6 GALLONS and NOT 1 GALLON.

KYBYBOLITE EXPERIMENTAL FARM

REPORT ON FARM CROPS, 1934-35.

[By L. J. Cook, R.D.A., Manager.]

Since the extension of pasture development work on the Farm, the cultivation of farm crops has been much reduced, and approximately only an area of 120 acres annually, of the 1,000-acre farm, has been put under cultivation of recent seasons. These crops have been grown principally to augment the feed of livestock, in producing grains for pigs, and hays and concentrates for the dairy herd.

An area of each type of cereal has been grown each year so as to provide a sequence of comparative yields since the commencement of records in 1910, but we have been unable to continue tests of varieties and treatments.

It is perhaps of considerable interest and importance to compare what effect the growth of subterranean clover and top-dressed pastures has had on subsequent crop growths. Consequently in Table 1 the mean yields of crops since 1926, when the effects of pasture improvement began, are shown comparatively with the mean yields since 1910, and of those of the immediate season:—

TABLE 1.—*Crop Returns for Season 1934-35 Compared with Mean Yields.*

Crop.	Period.	Mean Yield.	Mean Yield, 1926-34.	Average Yield, 1934.
		Bush. lbs.	Bush. lbs.	Bush. lbs.
Wheat	1910-34	14 38	14 45	24 28
Oats	1910-34	20 7	23 9	35 18
Barley	1910-34	14 29	25 49	35 28
Rye	1914-34	7 5	10 51	13 34
Peas	1921-34	11 23	9 13	10 44
		T. C. L.	T. C. L.	T. C. L.
Cereal Hay	1910-34	1 7 57	1 16 45	2 14 54
Ensilage	1920-34	4 12 96	5 8 8	5 1 91
Meadow Hay	—	—	1 11 60	1 2 88

From this table it is significant that all types of crops except one (peas) have yielded greater average returns during the immediate past nine seasons, and this is largely attributable to the improved physical condition and fertility of our soils, brought about by the growth of improved pastures. Certain individual results have been outstanding in this regard, and the main increases have been from Spring-sown cereals for grain and Autumn-sown cereal hay. Knowledge has been gleaned that treatments, methods, and varieties need to be altered as the soils are improved, and work in testing these matters is needed in the near future.

On referring to the final column of Table 1, the yields for 1934 show that a very good cropping season was experienced, in fact it has been the most productive in the history of the Farm. The returns of wheat, oats, barley, and cereal hay being quite 50 per cent. greater than the mean yields of recent years. The yields of grass ensilage and meadow hay were not as heavy as usual, due to the fact that, although the Spring rains were really good, they were a little late in falling, and consequently the clovers were unable to make the usual very heavy growth immediately before maturity.

The following table sets out the rainfall received at the Farm since 1910:—

TABLE 2.—*Rainfall Distribution at Kybybolite,* 1906-34.

	Means, 1906-15.	Means, 1916-25.	1926.	1927.	1928,	1929,	1930.	1931.	1932.	1933.	1934.	Means, 1906-34.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January ..	0·37	0·56	0·01	0·51	1·59	1·35	0·02	1·59	0·02	1·03	0·42	0·55
February .	0·93	1·10	0·48	1·20	1·74	0·22	1·57	0·10	1·92	0·02	0·19	0·95
March	1·53	0·57	0·06	0·96	0·55	0·65	0·06	0·98	2·11	1·12	0·36	0·96
April	1·50	0·83	2·10	0·20	1·50	3·12	1·15	1·98	2·32	2·32	2·97	1·41
May	2·52	2·61	3·17	2·92	2·24	2·16	1·39	2·54	0·86	4·97	0·08	2·47
June	3·14	2·83	1·24	1·63	2·53	3·32	0·34	3·40	3·38	0·93	0·57	2·65
July	3·13	2·71	2·71	2·14	2·71	3·08	4·34	2·52	2·46	0·93	1·97	2·80
August ...	2·67	2·61	3·31	4·02	0·90	1·84	3·65	2·32	2·48	2·79	2·13	2·63
September	2·96	2·69	1·79	0·91	3·12	1·75	2·95	1·85	1·39	3·65	2·98	2·65
October ..	1·80	1·92	2·27	0·52	4·47	1·50	2·55	0·47	1·58	1·05	3·36	1·90
November	1·55	1·51	0·68	2·06	0·99	0·97	0·93	0·38	0·59	3·90	1·87	1·48
December .	1·21	1·10	0·83	1·31	0·17	1·66	2·94	0·06	0·74	0·79	0·46	1·10
Total Rainfall	23·31	21·04	18·60	18·38	22·51	21·62	21·89	18·19	19·85	23·50	17·36	21·55
Total "Useful rain" April-November	19·27	17·71	17·27	14·40	18·46	17·74	17·30	15·46	15·06	20·54	15·93	17·99

The total rainfall for 1934 of 17.36in. is 4in. less than the mean for the past 29 years, and is the lowest total recorded except on three occasions, namely—1914, with 11.94in.; 1919, with 15.60in.; and 1925, with 16.08in. The distribution, however, was good for crop growths. January, February, and March falls were below average, but 3in. fell in April, which provided for good seeding preparation. May rains (8 points) were negligible, recording the driest May experienced, as never before during the life of the Farm had less than 70 points been recorded for this month. June also was very dry, recording only ½in. against an average of over 2½in., and also July, which usually is the wettest month of the season, recorded 1in. below the average. August with 213 points was also ½in. less than usual, but September recorded practically 3in., 33 points above the average. October rains were extremely good with 3.36in., 1½in. above the mean for the month. November also provided better falls than usual, allowing crops to finish well.

Table 3 shows the distribution of the rainfall collected into the various seasons of the year, and the high yields of grain received this year are due largely to the light winter rains, followed by comparatively heavy Spring and early Summer falls:—

TABLE 3.—*Distribution of "Useful" Rain, Kybybolite,* 1906-34.

	Means, 1906-15.	Means, 1916-25.	1931.	1932.	1933.	1934.	Means, 1926-34.	Means, 1906-34.
	In.	In.	In.	In.	In.	In.	In.	In.
Seeding rains (April-May)	4·02	3·44	4·52	3·18	7·29	3·05	4·22	3·88
Winter rains (June-July)	6·27	5·54	5·92	5·84	1·86	2·54	4·47	5·45
Spring rains (Aug.-Oct.)	7·43	7·22	4·64	5·45	7·49	8·47	6·84	7·18
Early Summer rains (Nov.)	1·55	1·51	0·38	0·59	3·90	1·87	1·37	1·48
Total "Useful" rain	19·27	17·71	15·46	15·06	20·54	15·93	16·90	17·99

CROPS.

119 acres were cultivated during the season, of which 108 acres were sown to cereals for ensilage, hay, or grain, 5 acres to field peas, and 6 acres to turnips.

Turnips.

One field (No. 4D) sown to Mammoth Purple Top turnips in October, 1933, was grazed by sheep during the Winter, but on account of the light and poorly distributed Summer and Autumn rains the crop was a poor one, and provided feed for only 14½ sheep per acre for six weeks during May and June.

A further 2 acres (Field No. 9F) of turnips produced a better crop.

These were used to supplement the feed of the dairy herd during May, and they were pulled daily, and carted to the dairy for slicing. On account of shortage of time and labour weights of these turnips were not taken.

Two fields, Nos. 4C and 9E (6 acres), were sown during the Spring of 1934, and are being reserved for the coming Winter feed.

The following table shows the grazing results of turnip crops grown on the Farm for the past 13 years, and shows an average annual carrying capacity of 2.64 sheep per acre, varying from 4.83 sheep in 1930, the best season for the crop, to 1.43 sheep in 1924, the lowest recorded grazing:—

TABLE 4.—*Feeding Results of Turnip Crops, Kybybolite,* 1921-34.

Season.	Total Rainfall, May 1st-April 30th.	Summer Rainfall, Dec. 1st-April 30th.	Area. Acres.	Total Feed Days.	Sheep per Acre per Annum.
	Ins.	Ins.			
1921-22	21·36	3·45	15·59	12,848	2·26
1922-23	19·33	3·52	16·80	12,417	2·02
1923-24	31·02	7·80	16·40	23,520	3·88
1924-25	17·00	2·83	16·36	8,564	1·43
1925-26	16·04	2·89	15·19	9,218	1·66
1926-27	18·87	3·70	15·56	14,772	2·60
1927-28	20·89	6·69	16·70	17,960	2·95
1928-29	22·47	5·51	18·03	16,747	2·54
1929-30	19·08	4·46	15·19	12,282	2·22
1930-31	23·74	7·59	15·13	26,653	4·83
1931-32	19·91	6·43	Not sown	—	—
1932-33	17·97	5·23	5·08	6,599	3·56
1933-34	22·95	4·73	4·11	2,520	1·68
Total mean	20·82	4·99	170·14	164,100	2·64

Ensilage Crops.

Of recent years use has been made of the flush Spring growth of pastures to make our ensilage supply, with good success. Mixtures of subterranean clover and grasses, cut from our improved pastures, have made excellent ensilage, which under analysis has compared more than favourably with cereal ensilage as a fodder. This season, on account of the dry winter, we were unable to close many fields from stock until late September, and consequently, although pastures made a very fine response to the Spring rains, they did not produce quite as heavy growth. The silo was filled by utilising pasture growths cut from 12.3 acres, and a mixture of cereal and undergrowth cut from Field No. 4B (5½ acres). 12 acres of pasture were also cut and stacked for ensilage in Field No. 17, but no weights of this could be taken.

Table 5 shows the yields of ensilage cut from various plots and fields:—

TABLE 5.—*Ensilage Yields, Kybybolite*, 1934-35.

Field.	Type of Growths.	Area.	Total Yield.	Yield per Acre.
		Acres.	T. C. L.	T. C. L.
No. 11B	Subterranean Clover, Wimmera Rye, and annual grasses	1·80	15 4 0	8 8 100
No. N4	Subterranean Clover, Wimmera Rye, and annual grasses	0·50	4 0 0	8 0 0
No. P33	Subterranean Clover and mixed grasses........................	1·00	6 10 0	6 10 0
No. N8	Subterranean Clover, Wimmera Rye, and annual grasses	2·00	12 3 0	6 1 56
No. 16A	Subterranean Clover and annual naturalised grasses	7·00	30 1 28	4 · 5 100
No. 4B	Cereal and undergrowth...........	5·52	22 16 0	4 2 68
	Total	17·82	90 14 28	5 1 91

Field No. 11B, which returned the greatest yield, received only light grazing by calves from June until 13th September. Plot P33 consisted of mixed pasture plots, and was not grazed during the Winter. Plot N8 carried a good mixture of subterranean clover and Wimmera rye grass, and was maintained well grazed until late August. Field 16A consisted of subterranean clover and annual grasses, mostly sterile brome, and was lightly grazed all through the Winter and Spring.

TABLE 6.—*Ensilage Returns, Kybybolite*, 1920-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.	Yield per Acre.
	In.	In.	Acres.	T. C. L.	T. C. L.
1920	20·87	19·20	25·27	44 10 84	1 15 28
1921	22·49	18·53	19·01	85 8 70	4 9 99
1922	20·69	17·11	11·95	61 8 101	5 2 94
1923	25·67	23·22	31·66	84 8 98	2 13 39
1924	20·42	15·02	15·32	84 14 98	5 10 71
1925	16·08	14·02	13·29	67 10 14	5 1 66
1926	18·60	17·27	19·16	79 14 28	4 3 23
1927	18·38	14·40	17·61	69 9 84	3 18 103
1928	22·51	18·46	13·03	90 11 56	6 19 3
1929	21·62	17·74	10·28	64 9 28	6 5 46
1930	21·89	17·30	14·48	78 0 28	5 7 84
1931	18·19	15·46	16·36	32 18 28	2 0 26
1932	19·85	15·06	22·66	211 6 0	9 6 56
1933	23·50	20·54	16·87	84 0 0	4 19 66
1934	17.36	15·93	17·82	90 14 28	5 1 91
Total	—	—	264·77	1,229 5 73	—
Mean	20·54	17·28	—	—	4 12 96
Mean, 1926-34.......	20·21	16·91	148·27	801 3 56	5 8 8

The above table shows the annual return of ensilage since 1920, and the yield for this season of 5 tons 1cwt. 90lbs. per acre is approximately 10cwts. better than the average. During the last three seasons, grass and clover ensilage has been made, and the average return from this type has been 6 tons 14cwts. 69lbs. per acre, a considerably higher return than was secured from cereal ensilage in the past.

Cereal Hay Crops.

Field No. 20D, that carried crops of wheat, barley, rye, and maize in 1933 following three years of subterranean clover grazing, was ploughed in April and during the last week of that month Algerian oats were sown at the rate

of 60lbs. seed with 1cwt. 45 per cent. superphosphate per acre. The crop was fed off by sheep during July and August, using 12 sheep per acre for 21 days. A thick crop, rank in places, was produced, and 20.35 acres were cut for hay, yielding 2 tons 14cwts. 54lbs. per acre, which is the highest average received for any season during the 25 years of results. It is almost double the average annual return per acre of 1 ton 7cwts. 57lbs. Other heavy yields were received in 1933 with 2 tons 10cwts. 94lbs., and 1912 with 2 tons 10cwts. 76lbs. The mean annual yield for the past nine seasons has been 1 ton 16cwts. 45lbs., 10cwts. per acre greater than for the previous 16 years.

TABLE 7.—*Cereal Hay Returns, Kybybolite,* 1910-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.			Yield per Acre.		
	In.	In.	Acres.	T.	C.	L.	T.	C.	L.
1910-19	20·92	16·75	1,028·45	1,228	19	12	1	3	101
1920-29	20·73	17·50	714·46	1,088	10	14	1	10	53
1926	18·60	17·27	59·19	93	18	28	1	11	82
1927	18·38	14·40	27·08	47	7	70	1	14	111
1928	22·51	18·46	25·14	54	15	0	2	3	62
1929	21·62	17·74	21·35	29	15	56	1	7	100
1930	21·89	17·30	13·89	29	0	56	2	1	89
1931	18·19	15·46	41·87	41	18	0	1	0	2
1932	19·85	15·06	28·46	51	6	28	1	16	7
1933	23·50	20·54	39·53	100	9	56	2	10	94
1934	17·36	15·93	20·35	55	8	84	2	14	54
1910-34	20·69	17·07	1,887·01	2,595	12	26	1	7	57
1926-34	20·21	16·91	276·86	503	19	42	1	16	45

Meadow Hay.

Approximately 72 acres of pasture were cut and cured this season, yielding 82 tons baled hay, or 1 ton 2cwts. 88lbs. per acre, whilst the mean yield for the past nine seasons has been 1 ton 11cwts. 60lbs. The quality of the hay was very good, but the lightness of yield was due to the late arrival of Spring rains, and the inability to close hay fields from livestock earlier in the Spring.

The next table shows the yields secured from the various plots and fields harvested:—

TABLE 8.—*Meadow Hay Yields, Kybybolite,* 1934.

Field.	Type of Hay.	Area.	Total Yield.			Yield per Acre.		
		Acres.	T.	C.	L.	T.	C.	L.
C1	Wimmera Rye Grass	4·25	8	18	0	2	1	99
N7	Sub. Clover and Wimmera Rye	4·00	7	10	84	1	17	77
N8	Sub. Clover and Wimmera Rye	2·00	3	14	28	1	17	14
C2	*Phalaris tuberosa*	4·25	6	4	28	1	9	26
N4	Sub. Clover and Wimmera Rye	3·50	4	2	56	1	3	64
No. 17	Sub. Clover and Wimmera Rye	13·50	15	6	47	1	2	78
P17	Sub. Clover and *Phalaris tuberosa*	5·00	5	8	0	1	1	67
P14	Sub. Clover and Wimmera Rye	5·00	5	7	0	1	1	45
P15	Sub. Clover and *Phalaris tuberosa*	5·00	4	19	44	0	19	98
No. 6F	Sub. Clover and Barley and Brome grass	9·62	9	0	48	0	18	85
No. 15A	Sub. Clover and mixed grasses	15·83	11	8	80	0	14	50
	Total	71·95	81	19	79	1	2	88

Plot C1 consisted of pure Wimmera rye grass that was sown on 10th May this year at the rate of 4lbs. seed per acre, following 10 years of subterranean clover and Wimmera rye grass pasture grazing. It was grazed back hard until 15th September, yielding 315 sheep-feed days per acre, or 21 days' feed for 15 sheep per acre. It made rapid and thick growth, and was cut for hay on 19th November, yielding 2 tons 1cwt. 99lbs. per acre.

Plots N7 and N8 have been established with subterranean clover and Wimmera rye grass since 1926, and carried a good sward of pasture. They each provided 9 days' grazing during the Winter months for 10 milking cows per acre until middle of August, and were cut for hay on 12th November. Their return of over 37cwts. per acre was very satisfactory.

Plot C2 consisted of pure *Phalaris tuberosa* sown on 10th May this year at the rate of 4lbs. seed per acre, following 10 years' grazing of subterranean clover and Wimmera rye grass pasture. A good germination was secured, but the grass is not very vigorous in its early life, and consequently only a light grazing of 60 sheep days per acre was secured during mid-September. It made a good Spring growth, and was cut for hay on 19th November, and yielded 1 ton 9cwts. 26lbs. nice quality hay per acre.

Both Plots C1 and C2 received the same treatment, and their comparison shows typical results of first-year growth of the two grasses, Wimmera rye and *Phalaris tuberosa,* the former producing five times as much Winter grazing and 12cwts. more hay per acre.

Plot N4 was similar pasture to N7 and N8, but was grazed later, until 15th October, with the equivalent of 2 sheep per acre all the Winter and early Spring. It was mown for hay on 16th November, yielding 1 ton 3cwts. 64lbs. per acre.

Field No. 17 was of similar pasture established in 1926, and was grazed until 5th October with the milking herd, carrying the equivalent of 2.31 sheep per acre from 1st April. It was cut for hay from 22nd November to 24th, and produced a good quality hay 1 ton 2cwts. 78lbs. per acre.

Plot P17 carried a thick stand of subterranean clover and *Phalaris tuberosa,* which has been established since 1930. It was grazed throughout the Winter months until 11th September, and carried 3.1 sheep per acre for that period. Hay was mown on 14th November, and yielded 1 ton 1cwt. 67lbs. per acre of really good quality meadow hay.

Plot P14 has been established with Wimmera rye grass and subterranean clover since 1929, and has received similar manurial treatment (1cwt. 45 per cent. superphosphate per acre annually) as plot P17. This plot carried 4.35 sheep per acre throughout the Winter months, was also mown on 14th November, and yielded 1 ton 1cwt. 45lbs. per acre, only a few pounds less than the *Phalaris* mixture.

Plot P15 carried a sward of *Phalaris tuberosa* that was sown on 9th May this year, on land that had been under subterranean clover and grass since 1930. A grazing was secured during September and early October equivalent to 1.27 sheep per acre for the Winter. The plot was closed on 10th October and mown for hay on 20th November, yielding 19cwts. 98lbs. per acre.

Field No. 6F was old cultivated land that had been established with subterranean clover since 1930. It was well grazed throughout the Winter until 18th September, and carried 4 sheep per acre for the six months. The pasture consisted of subterranean clover and annual naturalised grasses with a dominance of barley grass. It was mown on 15th November, and yielded 18cwts. 85lbs. of baled hay per acre.

Field No. 15A carries our grass seed trial plots, and the area sown in 1932 with strains of perennial rye grass and *Phalaris tuberosa* was mown on 22nd November. The area had been well grazed during the Winter with 2.02 sheep per acre up till 5th September.

The following table shows the yields of meadow hay secured since 1926 when the harvesting of pastures as hay was commenced at the Farm:—

TABLE 9.—*Meadow Hay Returns, Kybybolite,* 1926-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.			Yield per Acre.		
	In.	In.	Acres.	T.	C.	L.	T.	C.	L.
1926	18·60	17·27	1·66	4	2	70	2	9	87
1927	18·38	14·40	6·64	5	7	0	0	16	13
1928	22·51	18·46	18·71	35	14	28	1	18	20
1929	21·62	17·74	34·33	61	6	56	1	15	81
1930	21·89	17·30	22·71	37	0	0	1	12	65
1931	18·19	15·46	Not	harvested					
1932	19·85	15·06	49·89	102	5	28	2	0	111
1933	23·50	20·54	16·08	22	4	56	1	7	72
1934	17·36	15·93	71·95	81	19	79	1	2	88
Means	20·21	16·91	221·97	349	19	93	1	11	60

Oat Crops.

Algerian oats were grown in two fields. In No. 20D, particulars of which have been given under cereal hay, an area of 8 acres was left and harvested for grain, yielding 36bush. 23lbs. per acre.

Field No. 15B, which had been out of cultivation since 1923 and has carried ordinary top-dressed pasture, was ploughed by 7th May, cultivated, rolled, and drilled with 60lbs. seed per acre on 23rd May with 1cwt. superphosphate. The crop was fed off during the first fortnight of August, developed well in the Spring, and yielded 35bush. 2lbs. per acre.

The following table shows the returns received from oats since 1910:—

TABLE 10.—*Oat Returns, Kybybolite,* 1910-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.		Yield per Acre.	
	In.	In.	Acres.	Bush.	Lbs.	Bush.	Lbs.
1910-19	20·92	16·75	591·50	11,295	38	19	4
1920-29	20·73	17·50	573·37	11,862	8	20	28
1926	18·60	17·27	57·01	1,198	34	21	1
1927	18·38	14·40	57·41	1,744	30	30	16
1928	22·51	18·46	54·53	1,660	35	30	18
1929	21·62	17·74	40·11	419	10	10	18
1930	21·89	17·30	42·57	980	22	23	1
1931	18·19	15·46	not sown	not sown		not sown	
1932	19·85	15·06	52·54	974	9	18	22
1933	23·50	20·54	43·84	717	9	16	14
1934	17·36	15·93	31·29	1,108	38	35	18
1910-34	20·69	17·07	1,335·11	26,939	4	20	7
1926-34	20·21	16·91	379·30	8,804	27	23	9

The return of 35bush. 18lbs. received this season is the best recorded for the 25 years. In 1912 a return of 33bush. 20lbs. was received, and 30bush. per acre was received in both 1927 and 1928. The mean yield for the full period has been 20bush. 7lbs., but for the last nine years it has been 23bush. 9lbs., or 3bush. per acre better.

Barley Crops.

As seeding conditions during August were good, an extra field was sown to Cape barley. Field No. 15C, similarly to No. 15B, had been uncultivated since 1923. It was ploughed by August 13th, and subsequently cultivated twice, and harrowed three times to clear of weeds and work to suitable tilth. On 24th August it was sown with 75lbs. Shorthead barley and 1cwt. 45 per cent. superphosphate per acre. The crop developed well with only a few rank patches and headed well, yielding 40bush. 27lbs. per acre.

Field No. 20E.—The northern end of this field was grazed well in June, and pasture harrowed in July to break and spread stock droppings. It had been under clover grazing for three previous seasons in the five-course rotation of wheat, oats, and subterranean clover. The soil was ploughed 3in. deep by 27th July, and 10.86 acres were immediately sown with 75lbs. Shorthead barley and 1cwt. 45 per cent. superphosphate per acre. A really good thick stand of crop was secured, which became rather rank in places causing lodging and preventing the complete harvesting of all grain. The satisfactory yield of 36bush. 7lbs. per acre was received.

Field No. 9F carried Shorthead barley this season following a turnip crop which had been carted from the field during June and July. The soil was ploughed shallow on 28th July, and sown with barley on August 2nd. Germination was rather thin, but the crop developed comparatively well, yielding 29bush. 4lbs. per acre.

Field No. 4D also carried a light turnip crop in 1933-34 that was grazed by sheep during June. It was ploughed on 30th July, and sown to barley on 3rd August. Germination was poor, resulting in rather thin weedy crop, that yielded 17bush. 10lbs. per acre.

The following table shows the returns of barley received since 1910:—

TABLE 11.—*Barley Returns, Kybybolite,* 1910-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.	Yield per Acre.
	In.	In.	Acres.	Bush. Lbs.	Bush. Lbs.
1910-19	20·92	16·75	426·79	5,207 9	12 10
1920-29	20·73	17·50	214·13	3,134 39	14 32
1926	18·60	17·27	11·38	363 23	31 47
1927	18·38	14·40	11·15	313 38	28 7
1928	22·51	18·46	13·78	489 46	35 28
1929	21·62	17·74	14·74	117 21	7 48
1930	21·89	17·30	12·41	386 33	31 8
1931	18·19	15·46	11·42	129 40	11 8
1932	19·85	15·06	10·52	241 19	22 47
1933	23·50	20·54	16·41	281 45	17 9
1934	17·36	15·93	33·35	1,186 4	35 28
1910-34	20·69	17·07	725·03	10,567 39	14 29
1926-34	20·21	16·91	135·16	3,510 19	25 49

The average yield for the season of 35bush. 28lbs. is equal to the highest harvested on the Farm, the same average yield being obtained in 1928.

Other good years for barley were 1926 with 31 bush. 47lbs., 1930 with 31bush. 8lbs., and 1912 with 30bush. per acre. This year's return is considerably greater than twice the average yield of 14bush. 29lbs. received for the 25 years, and 10bush. better than the average of 25bush. 49lbs. secured for the past nine seasons.

Wheat Crops.

Only a small area was sown to wheat, on the southern end of Field No. 20E in the five-course rotation following three years of subterranean clover grazing. Thirteen acres were sown with Gallipoli variety on 20th June, on land that was ploughed in April, cultivated and rolled in May, and again cultivated in June before seeding; 80lbs. seed and 1cwt. 45 per cent. superphosphate were drilled per acre; 1½ acres each of Quality and King's White varieties were sown on 31st July on the northern half, which was ploughed immediately before seeding with 90lbs. seed and similar superphosphate dressing.

Tables 12 and 13 show the yields of these three plots and the wheat returns received on the Farm since 1910:—

TABLE 12.—*Wheat Yields, Kybybolite,* 1934.

Field.	Variety.	Area.	Total Yield.	Yield per Acre.
		Acres.	Bush. Lbs.	Bush. Lbs.
No. 20E	Gallipoli	13·15	342 3	26 1
No. 20E	King's White	1·53	28 53	18 53
No. 20E	Quality	1·53	25 48	16 52
	Total	16·21	396 44	24 28

TABLE 13.—*Wheat Returns, Kybybolite,* 1910-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.	Yield per Acre.
	In.	In.	Acres.	Bush. Lbs.	Bush. Lbs.
1910-19	20·92	16·75	570·06	8,924 20	15 39
1920-29	20·73	17·50	472·48	6,483 37	13 43
1926 ...	18·60	17·27	38·21	529 6	13 51
1927 ...	18·38	14·40	56·26	1,102 38	19 36
1928 ...	22·51	18·46	44·29	573 33	12 57
1929 ...	21·62	17·74	25·99	400 9	15 24
1930 ...	21·89	17·30	27·63	174 26	6 19
1931 ...	18·19	15·46	14·30	50 59	3 34
1932 ...	19·85	15·06	22·74	345 8	15 11
1933 ...	23·50	20·54	23·54	399 9	16 57
1934 ...	17·36	15·93	16·21	396 44	24 28
1910-34	20·69	17·07	1,146·94	16,774 23	14 38
1926-34	20·21	16·91	269·15	3,971 52	14 45

The average yield of 24bush. 28lbs. secured this year has only been exceeded on one occasion previously, in 1913, when the farm average for wheat was 26bush. 44lbs.

Rye Crop.

As usual an acre of rye was grown for grain production. This was sown in Field No. 20E on 31st July, and returned a yield of 13bush. 34lbs. per acre—4bush. less than wheat, and 23bush. less than barley sown at the same time under similar conditions.

The following table shows the returns received from rye since 1914:—

TABLE 14.—*Rye Returns, Kybybolite*, 1914-34.

Years.	Total Rainfall.	"Useful" Rainfall.	Acres.	Total Yield.	Yield per acre.
	In.	In.	Area	Bus. Lbs.	Bus. Lbs.
1920-29	20·73	17·50	40·19	238 42	5 56
1926	18·60	17·27	1·62	26 14	16 12
1927	18·38	14·40	1·77	26 42	15 5
1928	22·51	18·46	1·99	22 49	11 28
1929	21·62	17·74	1·89	3 32	1 52
1930	21·89	17·30	1·20	17 28	14 33
1931	18·19	15·46	1·63	6 19	3 53
1932	19·85	15·06	0·49	5 53	12 0
1933	23·50	20·54	0·99	14 0	14 8
1934	17·36	15·93	1·01	13 42	13 34
1914-34	20·35	17·09	78·83	558 44	7 5
1926-34	20·21	16·91	12·59	136 39	10 51

Pea Crops.

One small field (No. 4A) was sown to peas this year. The land was ploughed on 19th July, harrowed down, and immediately sown with peas—1.8 acres with 130lbs. White Brunswick, and 3.5 acres with 120lbs. Early Dun variety per acre, both with 1cwt. 45 per cent. superphosphate per acre. The plots made very good growth, especially the Early Duns, but adverse weather conditions at flowering time caused a poor setting of pods. The White Brunswick yielded 12bush. 37lbs., and the Early Duns 9bush. 48lbs. per acre.

Table 15 shows the returns of peas secured since 1921:—

TABLE 15.—*Field Pea Returns, Kybybolite*, 1921-34.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.	Yield per Acre.
	In.	In.	Acres.	Bus. Lbs.	Bus. Lbs.
1921	22·49	18·53	24·22	189 55	7 50
1922	20·69	17·11	18·77	261 57	13 57
1923	25·57	23·22	12·95	144 45	11 11
1924	20·42	15·02	23·62	536 48	22 44
1925	16·08	14·02	24·89	185 45	7 28
1926	18·60	17·27	15·28	175 14	11 28
1927	18·38	14·40	Failure.		
1928	22·51	18·46	13·08	174 27	13 20
1929	21·62	17·74	14·16	70 27	4 59
1930	21·89	17·30	5·03	20 23	4 3
1931	18·19	15·46	3·92	18 38	4 45
1932	19·85	15·06	3·81	42 34	11 10
1933	23·50	20·54	Grazed.		
1934	17·36	15·93	4·99	53 34	10 44
1921-34	20·52	17·15	164·72	1,874 27	11 23
1926-34	20·21	16·91	60·27	555 17	9 13

EXPERIMENTS WITH VARIOUS PHOSPHATIC FERTILISERS ON CEREALS, IN CONJUNCTION WITH SUBTERRANEAN CLOVER.

Three fields, Nos. 7A, 7B, and 7C, have been used for testing the citrate and acid-soluble phosphatic fertilisers against the water-soluble phosphate (superphosphate), and cereal crops have been grown every third season in rotation with two years' subterranean clover grazing. The plots are set out according to the phos-

B

phatic content of the fertilisers—each one being tested in equivalence in phosphoric anhydride—with applications of both 90lbs. and 180lbs. respectively of 45 per cent. superphosphate.

It was decided this season to discontinue the growing of the cereal crop, as the breaking of the clover pasture every third season showed to the disadvantage of the latter. The results for six seasons ending 1933-34 are given in Table 16, and shows that the greatest return of grain has been secured from lime and superphosphate fertiliser; with the heavy application of water-soluble phosphate about 2½bush. less per acre. The yields from the citrate and acid-soluble phosphatic fertilisers have been considerably lighter:—

TABLE 16.—*Experiments with Phosphatic Fertilisers on Wheat and Oats.*

Plot.	Fertiliser per Acre.	Yield per Acre. Wheat, Two Years. Average.		Yield per Acre. Oats, Four Years. Average.	
		Bush.	lbs.	Bush.	lbs.
1	90lbs. 45% Superphosphate (18½lbs. Phos. acid)	18	26	22	13
2	66lbs. 61% Ephos. Phosphate (18½lbs. Phos. acid) ...	15	28	20	23
3	Check plot—No manure	7	5	12	24
4	180lbs. 45% Superphosphate (37lbs. Phos. acid)	23	19	21	0
5	132lbs. 61% Ephos. Phosphate (37lbs. Phos. acid) ...	19	33	20	6
6	120lbs. 33% Bone manure (18½lbs. Phos. acid)	16	11	19	7
7	1 ton lime and 90lbs. 45% Super. (18½lbs. Phos. acid).	24	30	25	26
8	240lbs. 33% Bone manure (37lbs. Phos. acid)	19	20	18	14

ROTATION OF CROPS EXPERIMENT.

Rotation A.

This five-course rotation of 30-acre fields, consisting of wheat, oats, and three years subterranean clover was commenced in 1923. The following table shows the results received for the past 12 seasons:—

TABLE 17.—*Five-course Rotation of Crops, Kybybolite,* 1923-34.

Year.	Wheat.			Oats.			Subt. Clover, First Year.			Subt. Clover, Second Year.			Subt. Clover, Third Year.		
		Bush.	lbs.		Bush.	lbs.	Sheep per Acre.			Sheep per Acre.			Sheep per Acre.		
1923 .	(20D)	—		(20C)	4	27		—			–			—	
1924 .	(20E)	16	19	(20D)	19	29	(20C)	2	74		—			—	
1925 .	(20A)	14	53	(20E)	12	32	(20D)	1	84	(20C)	3	58		—	
1926 .	(20B)	8	44	(20A)	19	20	(20E)	2	35	(20D)	2	28	(20C)	2	12
1927 .	(20C)	19	57	(20B)	31	6	(20A)	3	13	(20E)	1	84	(20D)	2	47
1928 .	(20D)	10	44	(20C)	20	19	(20B)	3	25	(20A)	2	34	(20E)	2	85
1929 .	(20E)	15	53	(20D)	7	19	(20C)	1	73	(20B)	2	76	(20A)	3	83
1930 .	(20A)	5	53	(20E)	23	7	(20D)	3	03	(20C)	2	93	(20B)	1	92
1931 .	(20B)	3	53	(20A)	hay		(20E)	1	81	(20D)	2	58	(20C)	3	45
1932 .	(20C)	15	57	(20B)	not sown		(20A)	2	94	(20E)	2	39	(20D)	2	69
							(20B)	2	47						
1933 .	(20D)	16	15	(20C)	7	32		—		(20A)	1	77	(20E)	2	12
										(20B)	2	86			
1934 .	(20E)	24	28	(20D)	36	23		—			—			--	
Means		13	54		18	13		2	53		2	53		2	68

Subterranean clover maintains itself as the most valuable and productive crop in the above series, and the table shows the consistency of growth obtained from the pasture. From all the clover grazings in the past 10 years this series has a

carrying capacity of 2.57 sheep per acre annually. This means that on the 150-acre block of five fields we are able to carry 231 sheep, as well as cultivate 60 acres and have the stubble feed from the crops to spare.

Rotation C.

The testing of the Norfolk four-course rotation—turnips, barley or oats, peas, and wheat—on 4-acre fields is being continued. The test was commenced in 1919, and the following table shows the returns received during the past 16 seasons:—

TABLE 18.—*Four-course Rotation of Crops, Kybybolite,* 1919-34.

Year.	Peas.	Wheat.		Turnips.	Oats or Barley.
		Grain.	Hay.		
	Bush. lbs.	Bush. lbs.	T. C. L.	Sheep per Acre.	Bush. lbs.
1919 .	(4D) 2 31	(4A) 29 26	—	—	(4C) 17 4 oats
1920 .	(4C) 1 32	(4D) 29 50	—	—	(4B) 32 37 oats
1921 .	(4B) 3 14	(4C) 8 40	1 13 92	(4D) 1 74	(4A) destroyed
1922 .	(4A) fed off	(4B) —	1 17 10	(4C) 2 63	(4D) 30 0 oats
1923 .	(4D) 21 57	(4A) —	1 5 95	(4B) 6 10	(4C) 2t. 8c. 30lbs. hay
1924 .	(4C) 18 53	(4D) —	2 3 101	(4A) 1 54	(4B) 44 32 barley
1925 .	(4B) 7 39	(4C) —	3 0 60	(4D) 1 20	(4A) 18 17 barley
1926 .	(4A) 12 21	(4B) —	2 9 73	(4C) 2 75	(4D) 37 34 barley
1927 .	(4D) fed off	(4A) 26 49	1 11 8	(4B) 2 47	(4C) 36 45 barley
1928 .	(4C) 18 5	(4D) 6 26	—	(4A) 2 51	(4B) 34 24 barley
1929 .	(4B) 8 59	(4C) —	2 3 35	(4D) 2 69	(4A) 7 23 barley
1930 .	(4A) 4 3	(4B) —	2 1 29	(4C) 7 42	(4D) 34 0 barley
1931 .	(4D) 4 45	(4A) —	0 19 23	(4B) —	(4C) 18 37 barley
1932 .	(4C) 11 10	(4D) —	2 10 27	(4A) 3 56	(4B) 2t. 9c. 33lbs. hay
1933 .	(4B) fed off	(4C) 20 21	—	(4D) 1 68	(4A) 16 18 barley
1934 .	(4A) 10 44	(4B) —	1 7 60	(4C) —	(4D) 17 10 barley
Means	9 41	20 15	1 18 70	3 02	26 29 barley

Of the above crops the yields of all, except peas, are greater than the mean yields of the Farm. We have not of late seasons been able to maintain the supply of lime to these plots, and consequently this no doubt has reduced yields, especially those of pea crops. Sufficient result has been obtained to show that it is scarcely a suitable rotation for the district under present-day conditions.

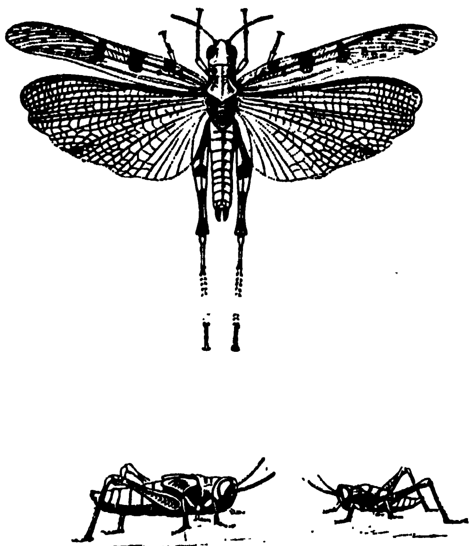
SOME FIELD OBSERVATIONS ON THE GRASSHOPPER PEST, WITH DETAILS OF TRAPPING EXPERIMENTS CONDUCTED AT SNOWTOWN.

[By W. C. JOHNSTON, R.D.A., District Agricultural Instructor, and F. C. C. GROSS, R.D.A., Field Officer.]

INTRODUCTION.

Owing to the widespread nature of the grasshopper pest in the spring of 1934 in many of the wheat growing districts in the State, a Committee was appointed by the Government to investigate the control of the pest. Accordingly, after several reports had come to hand regarding the insects at Snowtown, the Committee visited the locality on a tour of inspection.

After a meeting with members of the Snowtown Council, and at which that body consented to assist with certain labour and other facilities, it



Larger Plain Locust *(Chortoicetes terminifera)*.

[From *N.S.W. Agricultural Gazette.*]

Top—Adult.

Bottom Right—Youngest stage of "hopper."

Bottom Left—Late stage of "hopper," with wing pads well developed.

was decided to conduct trapping experiments by means of zinc sheeting and pits, which were reported to be effective in the control of locusts in Palestine.

The work was deputed to the writers, and the following paper is the result of observations made on the pest during this work, together with other field observations made during the subsequent invasion of the pest throughout the Lower North during the latter months of 1934 and the early part of 1935.

It is not proposed to deal with the subject from a scientific point of view, except to refer to the life history of the insect in so far as its more practical features have some bearing on the subject. Nor is it proposed to make any reference to poisoning; Dr. Davidson, of the Waite Institute, having contributed articles on this aspect of control in this *Journal*.

LIFE HISTORY.

The eggs are laid by the female in holes in the ground, made by means of hard chitinous appendages at the posterior of the abdomen, to a depth of from 2½-3½in., depending chiefly on the type of soil. Governed entirely by meteorological conditions, the eggs commence to hatch in from 3-5 weeks, or they may remain for a considerable length of time if optimium conditions do not prevail.

Upon hatching, the insects are similar to the adult, but of a dirty whitish colour, possessing no indications of wings, and about ⅛in. in length. After they have been in the light for a short time, their colour changes to a brownish grey.

The Winged Insect.

[From *Victorian Journal of Agriculture.*]

Provided food supplies are adequate, the insect passes through three forms before it becomes the winged adult. The first stage occupies about 3 weeks, during which time the skin is cast several times, the insect finally emerging with small rudimentary wing pads. After approximately 10 days, further development becomes visible, and the hopper requires more and more feed. The third stage requires a further 3 weeks, during which time the insect becomes much more active and very voracious. At the end of this time the skin splits and the winged form appears. Thus from hatching to the imago requires approximately 7 weeks.

The average life of the adult form is given as approximately 7 weeks, so that the life of the insect can be put down as being about 3 months.

FLIGHTS.

For some days after reaching the winged stage, the insect does not appear to realise its new means of progression, and it moves along with the less mature hoppers, only taking to the wing when forced to do so. Even such flights are of very short duration, and generally do not exceed a few chains in distance. However, as the insects become older, longer flights are the rule, but in such flights there does not appear to be any definite direction, except so far as influenced by winds.

When considerable numbers of them have reached the winged stage, there appears to be a general exodus from the hatching area. The first of these migratory flights is relatively short, but as the insects become older, the distance covered becomes increasingly great.

When flying they are capable of a speed of 15-20 miles per hour in a moderate breeze. At first, the height of flight does not exceed about 20ft., but when migration is more general, great heights are reached.

The insects do not favour timbered country when they are migrating, and lines of trees appear to act as a check on their line of flight. This feature was very evident on the Clare-Farrell's Flat road in December last, where there was a decided confluence of the fliers at every gap in the line of trees that borders this road. They seem to prefer to travel parallel with the timber, rather than go up and over the height of the trees.

A Swarm of Grasshoppers.

[From *Victorian Journal of Agriculture.*]

Time Flight Takes Place.

This feature is entirely governed by temperature; they were very seldom seen on the wing before about 9 a.m., and very seldom after the sun had lost most of its radiance in the afternoon, generally about 4.30 or 5 o'clock. Should the day temperature fall, or a cool change be experienced, the insects remain until the weather is more congenial to migration. During any forced delay in their migratory flights, the time is spent in feeding and egg laying, and the cool changes experienced during the early part of the year helped in no small measure to allow the very widespread distribution of eggs that subsequently proved to be the case.

Direction of Flight.

When on the hatching area, the direction of flight appears to be totally spasmodic, governed chiefly by the direction of the wind. Exceptions, however, are noted in which the insects fly directly into the wind.

Later, however, there is a very definite migration in a southerly direction. This is varied slightly in accordance with wind. Thus, with a westerly breeze the flight takes a south-easterly course, or with an easterly wind the movement is in a south-westerly direction. Should the wind be directly from the south, there is no further movement until there has been a change. Whether this feature is due to the direction of the wind being contrary to the line of movement, or whether it is due to the low temperature that invariably comes with a wind from this quarter, cannot be definitely ascertained. The writer inclines to the belief that it is chiefly due to the lowered temperatures, and not to any conscious effort on the part of the insects.

EGGLAYING.

The time that elapses from the emergence as a winged insect until it commences laying does not appear to be very definitely known, but observations lead one to express the opinion that this takes place fairly soon after the insect takes to the wing. At Snowtown, eggs were deposited at a very short distance from the hatching area, which tends to indicate that the insect was capable of this function within a week or so of becoming winged.

The process of egglaying is performed by the insect arching its body in order to place the posterior portion of its abdomen at right angles to the soil surface. Then by means of two pairs of chitinous appendages—rather like the claw of a hammer, with each pair of points turned outwards, and over which the insect has muscular control—it digs a hole into the soil for from 2½-3½in. in depth, the abdomen becoming greatly elongated in the process. When the desired depth has been attained a frothy gelatinous substance is exuded, and the eggs are laid in it. The eggs are long, thin, and sausage-shaped, and about $\frac{1}{16}$in. in length. From 30 to 50 are laid in each hole that is made. As the process continues, the hole becomes full of eggs, and at the same time the abdomen becomes contracted, so that by the time all the eggs are deposited, the insect has become normal in shape, and is ready to move on to some other site to lay again, possibly in a week or so.

Generally the egg cones are completed when about half an inch under the surface of the soil, in which case the remainder is filled with the same frothy substance. Its function appears to be to prevent dust and soil becoming tightly packed on the eggs below, thus allowing easy egress of the hatching insect.

It is usually considered that egglaying is confined to hard, well drained land with very little vegetation, and while it is readily conceded that such a site is generally preferred, it has been noted that eggs were laid in many conditions very far from the ideal.

At Snowtown, egg cones were taken from pea stubble that had only been reaped the week before, and later, in many parts of the Lower North, egg laying was observed in heavily grassed land, stubble, and on one occasion fallow, which carried a well prepared mulch, while frequent instances were observed of eggs being deposited in Sudan Grass patches, many of which were in a very loose condition.

HOPPERS.

After hatching, the insects do not move very far from the hatching area for several days, but as feed becomes more scarce, and the insects stronger, they begin to move away from the hatching ground. The rate of spread will be gauged by the abundance or otherwise of food supplies in relation to the number of hoppers that hatch on a given area.

Should greenfeed be plentiful the hoppers will move rather slowly, but if the reverse applies there will be a much more rapid migration, and should the greenfeed be very scarce only those with the greatest vitality will survive.

The question of the survival of the newly hatched hoppers in the summer calls for special comment, for it was frequently observed in the Lower North that even where they hatched in an abundance of greenfeed, such as lucerne patches or fields of Sudan Grass, very few of them survived more than a week or so. In fact, throughout the district, millions of hoppers hatched in January, 1935, but as was expected, they died within a week where the hatching had occurred in grassland on which there was no greenfeed. But the reason of the heavy mortality of the insects where food supplies were abundant offers a feature worthy of investigation. This position was noticed in too many cases to be purely a matter of coincidence.

The Rate of Migration.

This will be governed entirely by the supplies of greenfeed, and should this essential be plentiful, the hoppers will move at a rate of from 1 to 2 chains per day in the earlier part of their migration. Later, however, as more food is required by each individual, the rate of advance increases to 4 or 5 chains per day. During the final stage—before the insect becomes winged, and if food supplies are becoming short—the hoppers will move at a rate of about 4 miles per day in search of food.

Direction of Movement.

It was observed that the hoppers adopted the line of least resistance, thus they would travel down hill, along sheep pads, down the beds of creeks, and across fallows rather than through dry grass, and always with the wind, never against it. This characteristic can be turned to very good account in trapping the pests, and has led to the scheme of sheeting being used in directing them into pits where they can be destroyed.

During the trapping experiments at Snowtown, it was frequently observed that the hoppers could hop 2ft. in height when disturbed, but if left to move in their own way a 1ft. barrier would prevent their forward movement so long as they could not easily crawl over the material.

TRAPPING EXPERIMENTS CONDUCTED AT SNOWTOWN.

The Committee appointed by the Minister of Agriculture to assist and advise the Government in formulating some means to control the grasshopper pest, decided to conduct trapping experiments at Snowtown. It was decided that the method to be adopted would be along the lines of work done in Palestine where, by means of barriers of zinc sheeting, the pest was led into pits so designed that escape was impossible, and where the insects were destroyed.

Material Used.

Zinc sheets of No. 11 gauge 7ft. long by 3ft. wide were cut into 3 strips 1ft. in width. To hold the sheets in an upright position, wooden pegs 9in. long by 1¼in. square, sharpened at one end, were driven into the ground. Picks and shovels were used for sinking the pits.

THE WORK.

The work of experimenting was carried out on three different farms in the Snowtown area, on all of which the hoppers were in a very advanced state of maturity, which meant that their rate of movement was very considerable.

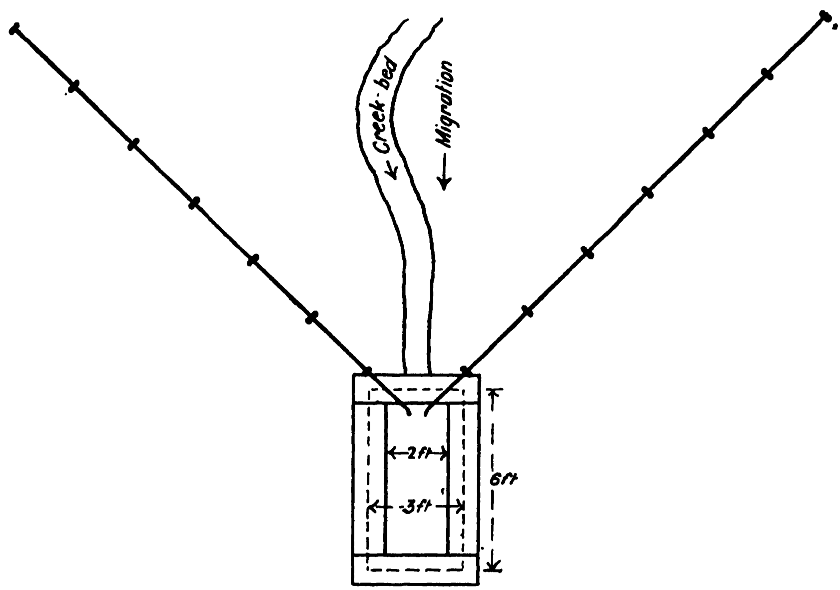
Three different types of traps were tried.

A. Traps in the bed of a creek.

B. A length of trench across the line of the advancing swarm of hoppers.

C. A barrier of zinc sheeting along the line of which were a number of pits.

A.—This type of trap was constructed on the farm of Mr. M. J. Donegan. It consisted of a pit 6ft. long, 3ft. wide, and 3ft. deep. At the ground level, sheets of zinc were so placed that they overhung the edge of the pit, the purpose being to prevent hoppers which entered the trap from escaping. On either side of the entrance to the pit, wings of sheeting were erected to form a barrier which would lead any stray hoppers into the trap.

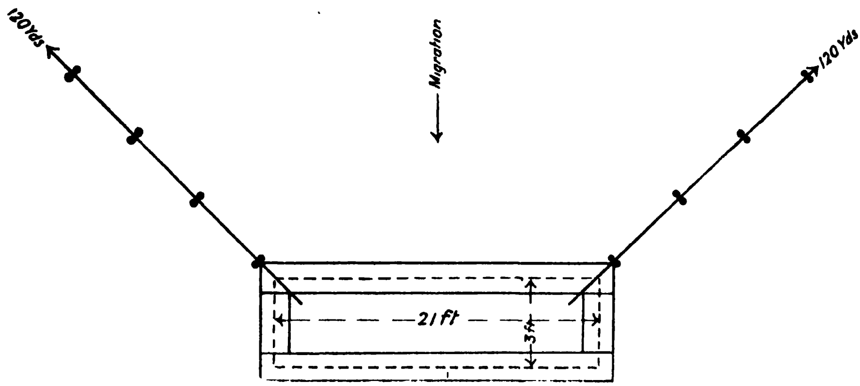


A.—Showing type of trap used on M. J. Donegan's farm in a creek bed.

The trap was successful in regard to the number of hoppers that entered it, but it was not so efficient in preventing their escape, chiefly due to the stoney nature of the soil causing much difficulty. The hoppers could crawl through the interstices of the rock and gravel, and when more material was added, the weight was greater than the zinc would support. However, after some difficulties were overcome, the pit proved successful in trapping the pest. So much so that it is felt that if more time was put into the selection of a less stoney site, or a frame work constructed to support the lining of the pit, this type of trap offers a very useful means of control.

It is suggested that in all cases of pit traps, light frames should be made about the size of the pits, in fact, all pits could be dug to the dimensions of the available frames. This would ensure a better overhang of the zinc lining, and, consequently, greater efficiency of the traps.

B.—In this experiment a trench was dug 21ft. long, 3ft. wide, and 3ft. deep, on the farm of Mr. W. G. Fidge. The trench was in the line of an advancing swarm of hoppers. From each corner facing the hoppers, a barrier of zinc sheeting was erected at an angle of 45deg. for about 120yds. on each side, to lead the insects towards the trench. The lip of the trench had an overhanging ledge of zinc sheeting which was to prevent any escape of the hoppers. Here again much difficulty was experienced in getting sufficient overhang to prevent the escape of the trapped insects, and yet prevent the sheeting from sagging. It was considered that light pins of iron or a framework of wood would greatly increase the efficiency of this type of trap.

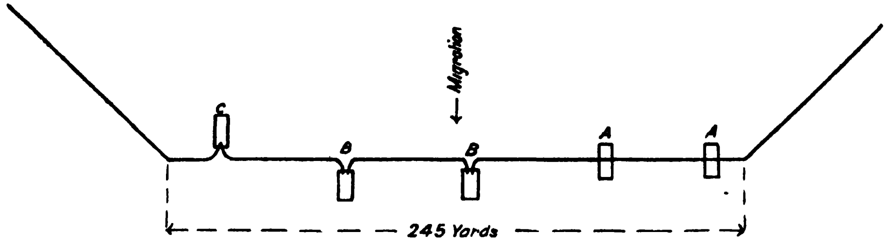


B.—Showing the type of trap used on W. G. Fidge's farm.

Another point that should receive very special attention in the construction of this type of trap is the slope of the walls. It is very important to have them perpendicular, or even better, with a slight overhang. Certainly great care should be taken to prevent any batter whatsoever, for if this should be done it facilitates the escape of the trapped insects.

This type of trap proved to be very effective in catching the hoppers, but its chief disability was the cost of construction.

C.—This experiment was conducted on the farm of Mr. A. M. Robertson. A wall of sheeting was erected 245yds. long, with a slight angle at each end of the barrier. It was placed across the line of advance of a swarm of very mobile hoppers. Along its length, at varying intervals, 5 pits were dug. The size of the pits varied within small limits, in length



C.—A diagrammatic sketch of the trap on A. M. Robertson's farm, showing the three different types, of which A type proved to be the most efficient. Note.—Pits were all standard length of 6ft., but width varied slightly; depth was standard 3ft.

and breadth; but the depth was kept as near the standard of 3ft. as possible. In 2 of the pits the entrance was by means of V-shaped races of sheeting, while in 2 others the sheeting was taken across the middle of the length of the pit. In the final pit, the entrance was made by curving a sheet of zinc into the back of the pit.

Of the different types of pits, the most successful was the one in which the sheeting was taken across the middle. This type also possessed the added advantage that in the event of a change in the direction of the wind it would still be effective as a trap for many of the migrating hoppers.

The size of the individual pits is not of any great consequence, but for economy in digging it was considered preferable to extend the length at the cost of the breadth. Care should be taken to ensure that there is an overhang from top to bottom, as this will greatly assist in the prevention of insects escaping.

PRACTICAL CONSIDERATIONS.

Erection of Sheeting.

In the original suggestions it was thought that the pegs which held the sheeting erect should be placed at distances of 1ft., and staggered each side of the line of sheeting. This method was tried but it was found that a quicker and more effective method was to have 2 pegs driven side by side into the soil. The sheeting was then forced between the pegs. By having 3 sets of such pegs to each sheet a very effective barrier was quickly erected.

In practice, it was found that the work was more quickly done by having the sheets stretched along the line, allowing just sufficient overlap. Then 4 pegs were dropped per sheet, 2 in the middle and 2 at the end, which, of course, was also the beginning of the next sheet. They were then driven into the soil as close together as possible, and the sheeting forced between the 2 pegs. In this way the sheets were found to be much firmer and did not vibrate in the wind to the same extent as with any other method which was tried.

This method of having the pegs in pairs was found to be very economical in erection, effective and speedily dismantled.

Suggestions as to the Pits.

The length of the pits depends upon the length of the sheeting with which the overhanging lip of the trap is to be made. For ease in excavation it will be found preferable to have the pit as long as possible. It will prove more economical to remove the soil from a long, relatively narrow pit, than from a square pit of the same cubic contents. This would be of importance where a number of pits were to be constructed. It is very important to have the walls of the pits overhung from top to bottom, as by so doing it is considerably easier to prevent any hoppers from escaping over the lip of the pit.

It was felt that material assistance would be obtained by having a light wooden frame-work constructed for each pit. In this way the overhanging lip of the trap would be more effectively constructed. This frame would be sunk to its depth into the soil, and the pit then dug with regular sides, all of which would facilitate the work. This framework would also prevent the sagging of the sheeting which was always found to occur in the construction of the traps.

On the experience at Snowtown there does not appear to be any necessity to cover the edge of the trap with soil. Careful observations did not show any hesitation on the part of the hoppers in crossing a bright metal surface. In fact, in all the later—and the most effective traps—the covering of the entrance of the pits with soil was omitted. Also it was found that the soil was very soon removed by the hoppers themselves, as they moved into the trap.

Time of Working.

The habit of the hoppers of not moving at night and during the cooler hours of the day, necessitates that any work which has to be done, in the way of erecting barriers or sinking pits, shall be done during the hours in which the hoppers are stationary. In effect this means that the work has to be done early in the morning or late at night. It was found that should the night be one of warm, sultry conditions, the hoppers will move forward even in the dark, but this is the exception and not the rule. Hence, working hours must be controlled entirely by weather conditions pertaining at the time.

In practice it was found that the work should not proceed later than 9 a.m. and should not be commenced before about 5.30 p.m. In the intervening hours, all work should be completed. This, of course, is controlled by the availability of labour to carry out the necessary work.

ACKNOWLEDGMENTS.

I wish to acknowledge the great assistance received from the Snowtown Council in making available sufficient money to carry out the work of the construction of traps, the transport of material, together with the use of tools, &c. To the Chairman of the Council particular thanks are due for his helpful criticism and suggestions; also to the members of the Council for their kindly interest in the work, and to the Town Clerk for his helpful advice, and the readiness with which he always found men for any work which was in progress.

My thanks are also tendered to the farmers, and especially Messrs. W. G. Fidge, M. J. Donegan, and A. M. Robertson for the readiness with which they co-operated in carrying out the work.

Lastly, but by no means least, I wish to offer my appreciation of the work of the men who did the manual labour, and who were ever ready to turn out, on many occasions at very inconvenient hours.

FARM SHEEP AND WOOL.

[By C. A. GODDARD, R.D.A. (Asst. Wool Instructor, School of Mines).]

(*Continued from page* 937.)

MARKETING AND GRADING WOOL.

Wool is sold by public auction, and like any other product sold in this way is subject to the vagaries of fashions and varying competition. These factors make fluctuations inevitable even when the sale is being conducted by an experienced salesman. These facts are often overlooked by wool-growers, many of whom believe that wool prices for different types are standardised for the sale which is in operation. In any auction bargains are frequently obtained by buyers, and likewise prices which are in excess of market value are sometimes paid.

Competition is the mother of trade, and wool-growers should do all in their power to foster competition by marketing their wool in an orderly manner.

The marketing of wool involves an immense amount of work, gives employment to thousands of men and a tremendous amount of capital has been laid out in buildings and plant. Rules and/or regulations have been framed by the wool-brokers and wool buyers' associations, which are strictly adhered to, and every effort has been made to show the huge Australian clip to the best advantage. In spite of the efforts made by the brokers, many wool clips are offered for sale in a most indifferent manner, due to lack of preparation for sale by growers.

Method of Marketing.

Sale dates are fixed and allocations arranged by the "Wool Council," some months before the selling season is due to open. The wool is offered for sale in the order of arrival into store. All wool as it enters the store is weighed on special scales, which are officially tested every day. The date of entry into store is recorded and the wool is then put into stacks, the position being carefully noted. When the time comes to make up the show floor, the show bales are easily located. When sufficient wool has arrived to fill the allocation for that particular sale it is closed, and later arrivals must wait for future sales.

A rough catalogue is made up, the show floor plotted, and the show bales are then removed from the stacks in the basement by lifts to the floor above, which is specially lighted. Here they are arranged in rows or streets, the bales standing back to back in double rows. Only a percentage of the bales of a classed clip are shown, but every bale of an unclassed clip and of star lots must be set out. The following percentages are exhibited:—

1, 2, or 3 bale lines (Star lots)—every bale is shown.
4 bale lots—2 shown, 1 capped.
5 to 9 bale lots—3 shown, 1 capped.
10 to 14 bale lots—4 shown, 2 capped.
15 to 24 bale lots—5 shown, 3 capped.

When the show floor is completed, the bales are opened and capped, and the wool is pulled ready for valuation. Printed catalogues showing each lot with their description and the number of bales they contain are given to the buyers and they proceed to value any lots that suit their requirements. The wool brokers' experts value every lot and a priced catalogue is prepared, which the auctioneer takes into the selling box with him as a guide when selling.

Valuing Wool.

There are several methods of valuation, some of which are rather intricate, such as the "Tear" method, which consists of judging not only the yield but also the combing results. It is sufficient, however, for the layman to know that wool is

always valued on its clean scoured basis, *i.e.*, the actual wool is valued and not the yolk and foreign matter it contains. Buyers are supplied with "limits," which are prepared from the ruling price for "prepared tops," and the raw wool must be bought in Australia at a price that will enable the top maker to sell at a profit at the ruling quotation. Therefore, all transit and conversion costs must be taken into account. When the limit has been supplied, the buyer valuates accordingly to it. For example, suppose the limit to be 22d. and the yield 45 per cent., then the value in Australia for greasy wool would be 45 per cent. of 22d. or $\frac{45 \times 22}{100}$ = 9.9 or 10d. per lb. The higher the yielding percentage the higher the greasy value. It will be seen from the above that wool valuing is only possible to the trained person. Many wool growers value their wool and set reserves on it. On a rising market this often proves profitable, but should the market weaken, the results would be serious. In a general way it is not advisable for a grower to set reserves, for it is the brokers' aim to get as much as he can, and he can be relied upon to do his best.

Selling Costs.

No doubt, to many the charges appear excessive, but it should be remembered that marketing wool entails an immense amount of work. Highly trained experts must be retained by the selling brokers and the clerical work involved in running a wool sale is tremendous. The regular charges are as follows:—

- Commission—Not over £200, 3 per cent.; £200-£500, 2 per cent.; over £500, 1½ per cent.
- Receiving, warehousing, weighing, sampling, advertising, cataloguing, and repacking sample bales, ¼d., less 10 per cent. per lb. rebate.
- Interlotting bales at 1s. 6d. per bale.
- Fire insurance at 2s. 6d. per cent.
- Bulking mixed bales and bags, ½d. on wools realising more than 2d. per lb., and ¼d. when wools realise 2d. or less per lb.

The sale is held in the city, the buyers attending with their priced catalogues. A wool sale differs from most other auctions, because a tremendous number of lots must be offered in a given time, and as the auctioneer either sells or passes a lot in a few seconds, the bidding is therefore fast and furious, many of the foreign buyers getting very excited, and a wool sale, especially when the bidding is keen, is very amusing.

The sale is not completed until the invoices are made out, the money collected, and finally the account sales in detail are sent to the selling grwers. Where wool is sold to go overseas the show bales must be refilled and sewn up, sent back to the basement, dumped and hooped ready for shipping, and finally carted to the wharves for loading into the ships.

Interlotting.

This consists of lotting together small lines of wool—"star lots"—which are even in type and value, and by so doing make one large lot out of several small ones. This practice was introduced with the twofold object of reducing the size of catalogues and enabling small lots to be sold in the main selling hall. Well done, no doubt it is a benefit to the grower, as the better competition of the main sale is obtained, but badly or carelessly done it is a doubtful blessing.

Bulking.

This means the pooling of the wool from mixed bales and bags into standardised classes, and has proved an unqualified success. Only a few years ago dealers were able to buy huge quantities of wool in bags at their own price,

pool it and resell, and make immense profits. Under the bulking system now in vogue, a farmer can be assured of receiving value for odd fleeces and small quantities of oddments sent to market in bags, and there is not the least doubt that this method of selling wool will extend until all small "star lots" will be bulked or pooled, and the sooner this comes about the better for the farmer and the State.

Grading the Wool.

One of the greatest problems facing the wool industry is to evolve some method of improving the marketing of small farm clips, but no improvements will ever be made until growers themselves realise that by carelessness and ignorance they are losing tens of thousands of pounds annually. When prices are low for all produce, and it is difficult to show a profit, it is urgently necessary for producers to obtain world's parity for their produce. That they are not getting it for wool in the majority of cases is a well-known fact in the trade.

Wool grading does not differ from that of any other produce, *i.e.*, it consists of the separation of the inferior from the superior, and the object is to grade in such a way as will enable buyers to value accurately. They are then in a position to bid up to their full limits, thus improve competition, and obtain better prices for the grower. The work must be done on definite grading principles, otherwise no standardisation can ever be hoped for. The grading principles are:—

1. Length of Staple.
2. Strength of Staple.
3. Quality.
4. Condition.
5. Colour.

When these principles are reviewed individually, it will be seen that when applied they simply divide the clips according to their manufacturing worth.

Length.—This has an important bearing on manufacture, and is the main deciding factor in determining whether wool is a clothing or a combing wool, or if the wool is to be carded or combed. The two processes differ and different machinery is used for each. Therefore, when very short wools are mixed with wools of combing length, neither section of the trade is being catered for.

Strength.—Soundness is an important factor to some manufacturers, while others disregard it. Therefore, to obtain the best competition sound and unsound wools should never be packed together.

Quality.—This refers to the diameter of the wool fibre and has an important bearing on yarn construction; some buyers require only fine wools, while others prefer broad ones. Therefore, quality is introduced to meet buyers' requirements.

Condition.—Wool is valued on the clean scoured basis, and even lines should be made to enable buyers to estimate yield accurately. Condition also has a bearing on freights; some wools will yield as low as 20 per cent., and this would mean that freight would be paid on 100lbs. to ship 20lbs. of wool. It is not an economic business to ship such low yielding wools. Therefore, condition is introduced into grading to separate low yielding wool from the superior ones. In many cases, if the low yielding back wool was not separated, the whole clip would be too heavy to allow export.

Colour.—Good, bright colour usually indicates high yield. Permanent defective colours interfere with dyeing and restrict the uses that wool may be put to, thereby reducing its value.

The grading principles must be applied in a practical way. They are worked collectively. *Length* separates the long from the short; *strength,* the sound from the unsound; *quality,* the fine from the coarse; *condition,* the light from the heavy; and *colour,* the bright from the dingy. Therefore, the superior wools are the longest, soundest, finest, lightest, and brightest wools, while the inferior are the short, unsound, coarse, heavy, and discoloured sorts. With definite principles laid down, it is now possible to proceed with the actual grading.

FLEECE TREATMENT.

The grading of a wool clip starts as soon as the fleece is thrown on the rolling table. Every complete fleece contains wools which vary in value and manufacturing worth, and unless the fleece is accurately and economically treated, the grading of the clip can never be successful. No definite rule can be laid down because fleeces differ, and each fleece must be treated on its merits. The object is to separate the inferior portions from the superior. This does not require technical knowledge, only care. Work around the fleece, removing only the discoloured, short, and hairy wool, and avoid removing clean fleece wool while skirting, as this means degrading a superior wool to a lower class.

The following photograph demonstrates an average skirting:—

Fleece treatment may be summed up as follows:—

1. Spread the fleece evenly on the table tip side up, then, starting at the neck, remove matted jaw pieces and any discoloured uneven wool from the head and neck; next attend to the shoulder points, removing the short discoloured wool only, then

the sweaty ends from the arm pit. Proceed to skirt along the side; very little should be removed here. The thigh and hind legs come next. Here the wool is frequently short and inclined to be hairy and matted, and it is often necessary to remove a fairly large piece from the hind points. Complete the skirting by removing any dags and urine stains from the breech.

2. After the skirting is completed, attend to the back. This work must be very carefully done. It is essential to remove all the earthy, tender wool, but in doing so do not remove sound fleece wool with it.

3. Roll the treated fleece into a neat bundle; the fleece is rolled to put it into a condition convenient for handling. Many growers look upon it as an important function and take all sorts of care to roll up a fleece with all the defects in the middle of the bundle. This is rather like the ostrich which puts its head in a hole and imagines that it is invisible; it is quite impossible to hide defects from the buyers in this way.

4. The farmer should attend to the fleeces himself unless he can afford to employ a reliable man. As a rule the farmer gets in the sheep, shears a bit, presses the wool, and does a host of rouseabout jobs. He leaves the most important work of all, *i.e.*, the wool work, to some inexperienced lad, and then when the wool is sold wonders why it does not fetch a better price.

Grading the Fleeces.

This work must be done on definite lines. The most common mistake is to put all the nice, bright fleeces as firsts and anything dull as seconds; this is done irrespective of length and quality or even soundness, and grading on these lines is quite useless. The grading principles must all be taken into consideration when setting fleece standards. The size of the clip has a most important bearing. It would not be practical to divide a small clip into a lot of classes, and before starting it is a good idea to make an estimate of the number of bales of fleece wool that may reasonably be expected. A good average flock should cut 2½ bales to the hundred. A flock of 300 grown sheep, therefore, should fill 7½ bales. Allow for 1½ bales of backs to be removed, and this leaves 6 bales of fleece wool. A clip of this size, which is the average one on South Australian wheat farms, does not allow of any extensive grading, and the practical method of dealing with it is to make one main line above a "star lot," which is 4 bales or over, and a small "star lot" of mixed fleeces. In a 6 bale clip, if one bale is rejected, the remaining 5, if the clip is of average standard, would be reasonably even in length, strength, quality, condition, and colour.

Another point to consider with a small clip of this description is that there is frequently a variation in ages and sexes. When the clip is large enough to warrant it they should be packed separately, but in a small clip like the one under discussion, it would be wise to disregard ages and sexes, except the few rams' fleeces, which may be packed in bags. The only difficulty in classing a clip on these lines is to know just the right types of fleeces to reject. The farmer woolclasser can, with a little practice, get over this difficulty by learning to analyse each fleece carefully. A staple should be drawn and the length observed. If the clip is a well-grown one, 2½in. could be made the minimum length; on the other hand, if the clip is a short one, this length could not be maintained. The staple is next tested for strength; if it will withstand a reasonable strain it is sound, if it breaks easily it is unsound. The quality is next considered; if the crimps are wide apart, the wool is coarse, if close together, fine. The condition is tested by lifting the fleece; if it is heavy and feels greasy and fatty, it is

heavy condition, if it is bulky, of reasonable weight, and feels dry, then it is light. The rejects are easily decided upon if the analysis is made carefully, and the following descriptions automatically become rejects:—

1. Very short fleeces.
2. Unsound fleeces.
3. Extra heavy dingy or discoloured fleeces.
4. Extra coarse and extra long fleeces.

When any fleece is out-type in length, that is very long, close examination will nearly always reveal the fact that the crimps are wide and that the fleece is strong or coarse. These long fleeces are nearly always light and bright and look most attractive. Nevertheless, they should be rejected, because they do not match with the average fleece type. When the clip is divided on these lines it is advisable to brand the firsts, that is, the bulk of the clip, A. Mo., and the seconds Mo.

The main line A. Mo. would contain 4 or 5 bales of good fleece wool which has been carefully skirted and backed, and is sure to meet with good competition. The small line, 1 or 2 bales branded Mo., will be made up of out-type fleeces, and can only be sold to advantage when sent to the bag pool and bulked. Farmers, when consigning their wool, should make a point of asking to have this done, otherwise it will be bought by a dealer who will make a good profit, which is far better in the farmer's pocket.

Clips of 500-700 Fleeces.

There are many clips of this size, and while the same principles are employed in fleece treatment and the classing of fleeces, the work may be extended to advantage. Instead of making only one main line and a mixed sort, two classes of fleece should be made, which would contain the firsts and seconds of the fine to medium quality, and also one class to take the coarse fleeces, as well as the small mixed sort. The classes would be as follows:—

A. A. Mo.—Consisting of the longest, brightest, sound, fine to medium quality fleeces.

B. Mo.—Consisting of the long coarse fleeces.

A. Mo.—Consisting of sound fleeces, but shorter and heavier and generally less attractive.

Mo.—Consisting of the out-type fleeces, *i.e.*, very short, dingy, extra heavy fleeces.

Clips of 1,000-1,500.

Clips of this size would require still more extensive grading, and as 25 to 30 bales could reasonably be expected when the clip is made up of breeding ewes, a few wethers and hoggets, it would be advisable to class them separately so far as the main classes are concerned, but the low grade fleeces from each might be bulked to make one big line. Make one main line of hoggets and also of wethers, and allow the low grade fleeces from each to go in with those from the ewes. On these lines, the following classes would be made:—

A. A. Ewes.—Consisting of the best of the ewes' wool.

A. Ewes.—Consisting of the second grade ewes' wool.

A. A. Hog.—Consisting of the best of the hogget fleeces.

A. A. Wethers.—The best of the wethers.

A. A. Com.—The coarse fleeces from all ages and sexes.

C. Ewes.—Consisting of all the reject fleeces, that is, very short, heavy, and unsound.

Cross-breds.

The same principles are employed in the grading of cross-bred wool as in Merino, but the sheep are bare on the head and points as compared with Merinos, and a much lighter skirting usually suffices. The wool also shows a greater variation in quality. With large cross-bred clips, careful typing will result in even lines, but with small cross-bred clips there is not sufficient wool to allow this. The fleeces should be carefully but lightly skirted and backed when necessary, and graded as follows:—

A. + BRED.—The bulk line consisting of fine to medium fleeces, sound and light to medium condition, reasonably even in length.

+ BRED.—The small "star lot," consisting of extra coarse, matted, unsound discoloured fleeces. This line should be sent to the bag pool for bulking.

It is always difficult to grade a small cross-bred clip evenly, but reasonably good results may be obtained by rejecting extra short and extra long fleeces, and also any cotted or matted ones.

Mixed Clips.

It is a great mistake to have mixed flocks; however, many farmers have them, and marketing of the clip is difficult. The only practical way to deal with such a clip is to keep the two types strictly separate from the fleeces down to the locks. Shear them separately if possible; if not, keep a bag handy and sweep up the locks after a cross-bred is shorn and put them into it. Do the same with the skirtings and belly wool.

Grading Lambs' Wool.

Length is the chief determining factor in the value of lambs' wool; it is important, therefore, to pack the long, well-grown wool in different packages than the short wool from the young lambs. There is seldom sufficient lamb wool shorn on farms to make bale lots. Nevertheless, it is advisable to grade, because even where it is found necessary to send the small quantity of wool to market in bags, those containing the good wool will eventually be bulked with other wool of the same type until bale lines are made. Send it in mixed and it will all have to be bulked together, because it cannot be satisfactorily separated after being mixed. Lambs' fleeces do not hold together. They cannot, therefore, be spread on a rolling table. The following method should be adopted:—Cover the rolling table with a cloth, pick up the lambs' fleeces after they are shorn with two pieces of board about 9in. wide, two boards from the side of a petrol case will answer the purpose. Place the fleece on the table, then shake it well and the heavy points and belly will fall to the bottom. The long, light wool will be the firsts and the heavy shakings the seconds. When a young lamb is shorn and the fleece is very short, put it all into the seconds. Brand the firsts "A. LAMBS" and the seconds "LAMBS." Never mix Cross-bred and Merino lambs' wool.

The Oddments.

The oddments, *i.e.*, the skirtings, backs, bellies, stained pieces, and locks, are nearly always neglected in a farm clip, yet they represent, without the backs, approximately one-eighth of the clip, or one complete bale, and consequently they are worthy of every consideration. They may be packed separately in bags or in a bale with a cap separating each sort. There is not enough wool to allow of regular classings of the oddments, but there are a few important points to observe.

1. The pieces should be picked over and any urine stains removed.

2. The bellies should be very lightly trimmed and pizzle stains removed from the belly wool of male sheep.

3. The backs are usually in sufficient quantity to be packed separately and they should be branded BKS.

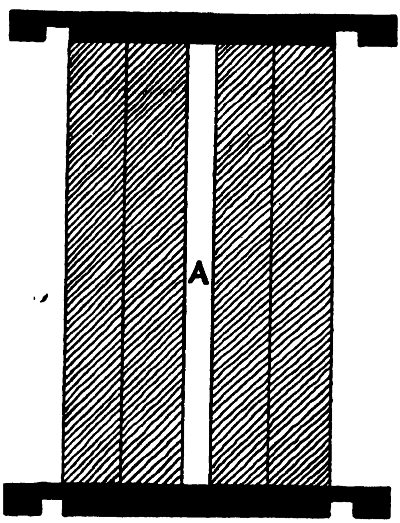
4. Urine stained wool must always be packed separately, even when there is only sufficient to fill a bag. They are branded STN. PCS.

5. Locks should be picked over, dags removed, and any large pieces picked out and put with the pieces.

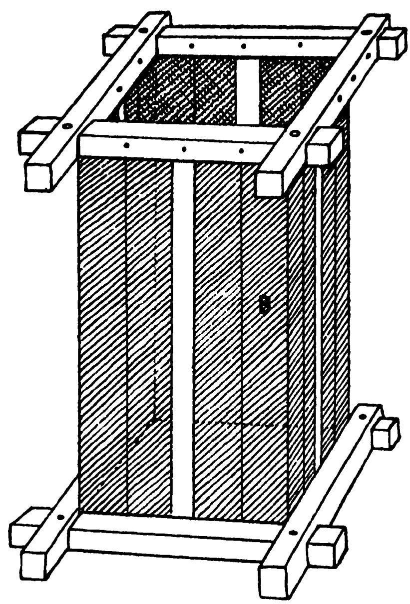
6. Never on any account throw the fleece skirtings under the table to be mixed with the locks. This is a common, but wasteful practice, because it reduces good skirtings to the same price level as locks.

Pressing and Branding Bales.

It is important to send wool to market in neat packages and to do this a press must be used. The method that so many farmers adopt of suspending a a woolpack on four wires from the rafters is not so satisfactory, as neat bales cannot be turned out in this way. A box press can be made at very little expense and is quite effective. The following illustrations and specifications will be a guide when making one.



SECTION OF WOOL PRESS



WOOL PRESS

MATERIAL REQUIRED.

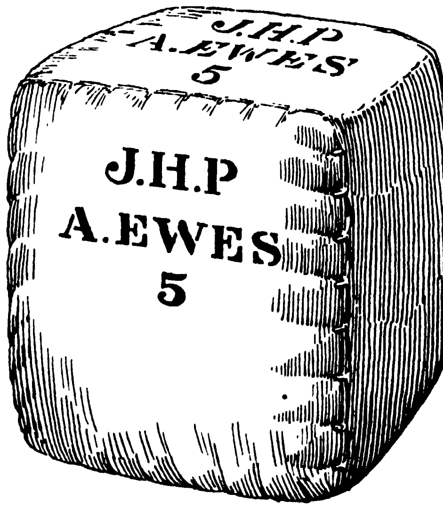
Press 4ft. 6in. high by 2ft. 3½in. wide.

Cross pieces, 3 x 2 softwood, 24ft.

Boards for sides, floor boards, softwood, 75ft.

When filling, place the fleeces in layers of six, and pay special attention to the stamping of the bottom. When finishing off a bale, place at least one layer of fleeces above the sides of the press. Strain the cap over the top with pins

and then sew the front side first. When the front and one side are sewn, if necessary, a fleece may be stuffed in from the side still remaining open; this is done if the top is a little slack.



BRANDING THE BALES.

Bales should be branded neatly on the cap and the front side, with the owner's mark, description, and number. Special care must be taken to brand on the front side, because the bales are placed on the show floor back to back; the front is the only visible side. Stencil plates can be easily cut from the side of a petrol tin, using a ¼in. chisel. Even when cut in stout cardboard, stencil will last long enough to brand the season's bales. The illustration will demonstrate exactly how a bale should be branded.

THE HILLS HERD TESTING ASSOCIATION.

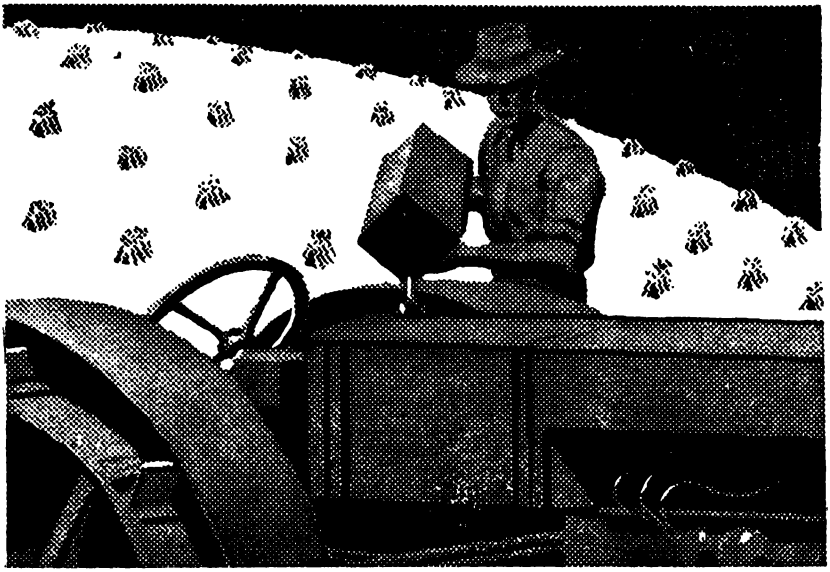
RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February	Per Cow during February	Per Cow July to February.	Per Herd during February	Per Cow during February	Per Cow July to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	9·50	8·46	5,102½	537·11	3,899·41	239·28	25·19	186·94	4·69
7/L ..	33	28·64	13,896½	421·10	4,395·46	574·45	17·41	193·40	4·13
7/P ..	29·57	17·21	7,283	246·30	4,610·85	331·33	11·20	222·14	4·55
7/AA .	25	21·21	6,982½	279·30	4,342·95	315·62	12·62	196·96	4·52
7/TT	16·96	15·89	8,457½	498·67	5,596·91	366·02	21·58	245·34	4·33
7/UU	29	13·14	2,312	79·72	3,455·34	99·43	3·43	148·09	4·30
7/XX	23	19·61	10,551½	458·75	4,986·82	572·09	24·87	265·65	5·42
7/BBB	69·25	52·43	28,614	413·19	4,334·66	1,191·36	17·20	192·38	4·16
7/CCC.	25	20·61	7,948	317·92	4,010·54	327·60	13·10	174·43	4·12
7/DDD	13	10·54	5,451	419·30	4,677·90	256·67	19·74	225·92	4·71
7/EEE	9·96	7·86	4,785	482·07	4,482·88	219·36	22·11	226·65	4·50
7/GGG	18·57	12·86	4,383	236·02	2,778·53	198·74	10·70	126·68	4·53
7/HHH	12	12	3,892	324·33	5,123·64	137·51	11·46	179·09	3·53
7/III..	16	13·64	4,908	306·75	5,380·31	181·51	11·34	189·73	3·70
7/JJJ	13	5·54	1,502	115·53	3,177·72	65·47	5·04	152·11	4·36
7/KKK	30	27·21	9.253½	305·65	4,100·74	452·11	14·95	205·88	4·93
7/LLL	18·46	17·46	8,445½	457·50	4,671·64	441·25	23·90	249·61	5·22
7/MMM	15	13·14	5,286	352·40	3,512·70	276·35	18·42	181·49	5·23
Means	22·57	17·64	77,251·94	342·27	4,297·75	347·01	15·37	197·41	4·41

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat			Average Test
			Per Herd during February.	Per Cow during February.	Per Cow December to February.	Per Herd during February.	Per Cow during February.	Per Cow December to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18	14·71	4,090	227·22	884·91	223·33	12·41	46·73	5·46
6/C ..	17·18	11·89	6,692½	389·54	1,631·66	293·87	17·11	68·46	4·39
6/Y ..	14	12·57	6,616	472·57	1,379·71	264·09	18·86	57·44	3·99
6/FF .	26·79	26·18	16,280½	607·70	2,467·57	699·62	26·11	99·95	4·30
6/II ..	18·43	14·36	11,513	624·68	1,854·03	477·00	25·88	78·02	4·14
6/KK	20	17·82	9,423	471·15	1,600·83	342·02	17·10	59·19	3·63
6/LL .	25	21·14	12,580	503·20	1,884·72	466·91	18·68	67·28	3·71
6/OO .	17	15	9,758	574·00	2,121·70	423·67	24·92	89·98	4·34
6/SS .	16	16	11,494	718·87	2,392·96	443·66	27·73	91·59	3·86
6/TT .	25	22	18,302	735·59	2,025·75	734·88	29·52	82·14	4·05
6/VV .	25·96	24·68	16,968½	653·64	2,371·34	792·16	30·51	104·74	4·67
6/XX	27	23·50	14,238	527·33	2,352·89	558·76	20·69	94·67	3·92
6/CCC	26	19·75	9,681	372·35	1,559·92	436·17	16·78	68·70	4·51
6/DDD	26	23·57	13,069	502·65	1,785·62	646·52	24·87	80·91	4·95
6/JJJ	25	19·57	13,951½	558·06	2,029·67	659·80	26·39	94·71	4·73
6/MMM	9	7·50	5,950	661·11	2,570·12	283·78	31·53	100·42	4·77
6/NNN	36·86	33·21	20,936	567·97	1,976·77	946·79	25·69	84·82	4·52
Means	21·95	19·03	11,855·47	540·01	1,941·99	511·35	23·29	81·54	4·31



NARRUNG HERD TESTING ASSOCIATION.

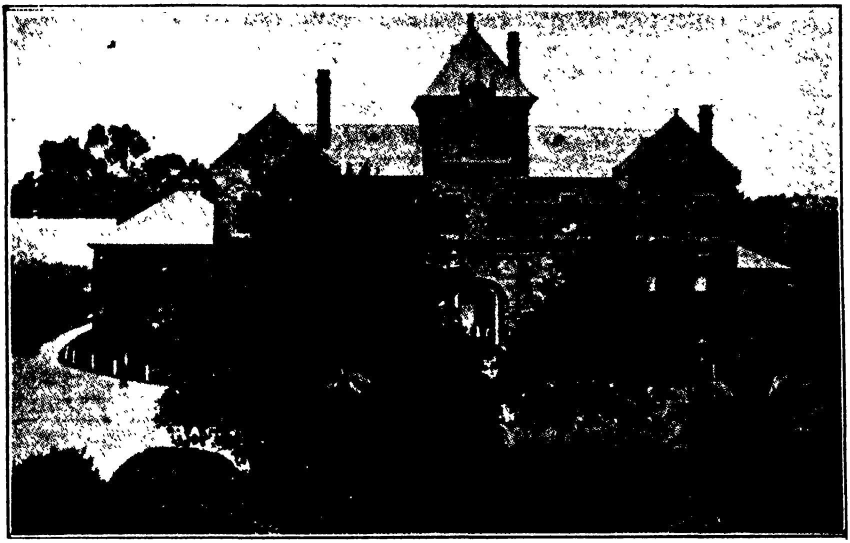
RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	31·39	15·36	7,292	232·30.	2,090·98	383·40	12·21	109·33	5·22
5/D ..	30	20·43	9,026½	300·88	2,357·33	472·27	15·77	126·17	5·23
5/E ..	38	28·18	12,964	341·12	2,678·88	673·83	17·73	134·52	5·20
5/R ..	70	57·11	15,884½	226·92	2,199·51	780·88	10·44	98·68	4·60
5/Ee .	23	23 .	10,038	436·43	2,892·03	531·81	23·12	144·84	5·30
5/Z ..	32·39	24·86	18,591	578·94	3,356·29	900·55	27·80	169·02	4·84
5/Kk.	14·50	13	8,792	606·34	3,391·06	396·75	27·36	157·00	4·51
5/Ww	20	11·96	3,663	183·15	2,127·96	189·23	9·46	102·35	5·17
5/Xx.	20·36	14·86	4,647½	228·26	2,568·77	265·08	13·02	136·00	5·70
5/Yy	11	8·93	3,082	280·18	2,201·08	155·77	14·16	108·74	5·05
5/Aaa	17·86	16·14	6,340	354·98	2,566·92	320·01	17·92	125·80	5·05
5/Bbb	16·21	16·14	4,323	266·68	2,282·05	219·43	13·54	113·31	5·08
5/Ddd	26·86	23·29	17,652	657·18	4,045·58	741·18	27·59	159·89	4·20
5/Eee	20	18·14	12,116	605·80	3,238·85	553·75	27·69	145·63	4·57
5/Fff.	9·54	9·54	2,605	278·01	2,841·01	130·17	13·64	130·17	5·00
5/Ggg	9	8·54	3,105½	345·06	2,757·76	152·79	16·98	125·25	4·92
5/Hhh	15	14·18	6,797½	453·16	3,400·55	279·68	18·65	135·25	4·12
Means	23·83	19·04	8,642·32	362·67	2,693·30	417·45	17·52	128·25	4·83

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow March to February.	Per Herd during February.	Per Cow during February.	Per Cow March to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	30	25	13,191½	439·72	5,617·83	608·22	20·27	292·35	4·62
9/B ..	17	17	8,960	527·05	5,534·76	389·34	22·90	254·10	4·34
9/C ..	13·32	12·75	6,111½	458·81	6,224·19	261·03	19·60	271·82	4·27
9/D ..	31·68	24·89	15,088	476·26	6,724·45	729·84	23·04	358·78	4·84
9/E ..	17·29	17·29	7,734	447·31	6,278·74	377·58	21·84	298·73	4·88
9/F ..	18·71	14·11	4,809½	257·05	6,158·14	216·65	11·58	268·18	4·51
9/G ..	30·21	30·36	15,645	517·87	6,418·07	745·58	24·68	324·83	4·77
9/H ..	19	17·89	9,588	504·63	8,242·52	455·18	23·95	358·43	4·75
9/I ..	32·68	23·64	8,426½	257·85	4,822·69	393·27	12·03	203·18	4·67
9/J...	57	38·43	12,723	223·26	4,058·26	487·65	8·55	164·26	3·82
9/K ..	24	20·57	5,096	212·33	3,990·06	248·69	10·36	194·39	4·88
9/L ..	28·82	12·46	4,737	164·36	3,933·96	192·10	6·67	154·38	4·06
9/M .	19	16·86	2,736	144·00	2,180·36	136·81	7·20	99·51	5·00
9/N ..	27·71	17·11	6,653	234·19	5,132·16	282·98	9·99	210·39	4·29
9/O ..	25·79	22·18	8,429	326·83	5,701·74	385·63	14·95	248·87	4·57
9/P ..	45·96	17·46	5,452	116·17	4,486·37	266·18	5·70	208·05	5·06
					April-Feb.			April-Feb.	
9/Q ..	25	27·64	7,203	288·12	4,514·63	332·23	13·29	210·08	4·61
9/R ..	8	8	3,818	414·75	5,297·26	178·60	21·70	261·00	5·23
					May-Feb.			May-Feb.	
9/S...	13	13	6,566	505·07	6,689·12	267·91	20·61	282·32	4·08
9/T ..	22·14	18·11	5,877	265·44	5,863·34	261·27	11·80	269·59	4·45
9/U ..	15	9·43	3,272	218·13	4,305·32	185·52	12·37	230·11	5·67
					June-Feb.			June-Feb.	
9/V ..	10	5·21	1,566	156·60	3,337·95	90·05	9·01	182·83	5·75
9/W .	29	24·71	11,210	386·55	4,465·51	436·47	15·05	179·57	3·89
					Jan.-Feb.		Sept.-Feb.	Jan.-Feb.	
9/X .	10·29	9·79	3,820	371·23	1,013·62	196·76	19·12	51·80	5·15
Means	23·78	18·50	7,425·50	312·32	5,420·76	338·36	14·23	247·00	4·56



OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

FINAL SCORES—SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.	
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	217	
	2	214	
	3	29	460
	4	—	
	5	198	
	6	150	348
			808
A. H. Matthews, Bridgewater	7	161	
	8	171	
	9	144	476
	10	190	
	11	dead	
	12	45	235
			711
G. W. T. Symes. Echunga	13	187	
	14	28	
	15	205	420
	16	107	
	17	150	
	18	191	448
			868
E. B. Gliddon, Yundi	19	189	
	20	112	
	21	dead	301
	22	dead	
	23	81	
	24	83	164
			465
T. Cleaver, Bridgewater	25	173	
	26	112	
	27	dead	285
	28	106	
	29	dead	
	30	170	276
			561
J. E. Assender, Echunga	31	148	
	32	162	
	33	151	461
	34	84	
	35	128	
	36	189	401
			862
S. Hill, Bridgewater	37	203	
	38	94	
	39	274	571
	40	175	
	41	dead	
	42	151	326
			897
W .Restall, Echunga	43	199	
	44	229	
	45	dead	428
	46	159	
	47	146	
	48	163	468
			896
C. Guthridge Yundi	49	180	
	50	219	
	51	189	588
	52	32	
	53	73	
	54	124	229
			817
S. Lambert, Echunga	55	187	
	56	28	
	57	dead	215
	58	44	
	59	142	
	60	140	326
			541
A. Young, Bridgewater	61	100	
	62	219	
	63	166	485
	64	208	
	65	180	
	66	208	596
			1,081
D. J. Foxwell, Echunga	67	184	
	68	173	
	69	118	475
	70	160	
	71	127	
	72	45	337
			812
J. C. Normandale, Yundi	73	157	
	74	210	
	75	192	559
	76	158	
	77	152	
	78	170	480
			1,039
L. W. Sando, Echunga	79	185	
	80	dead	
	81	151	336
	82	209	
	83	206	
	84	163	578
			914
J. O. Marshall, Yundi	85	216	
	86	251	
	87	53	520
	88	dead	
	89	186	
	90	177	363
			883
Murray Powell, Jupiter Creek	91	102	
	92	190	
	93	199	491
	94	dead	
	95	215	
	96	69	284
			775

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.	
	97	187	
	98	163	
	99	159	509
S. Bridge, Yundi	100	139	
	101	dead	
	102	201	340
			849
	103	97	
	104	149	
	105	175	421
C. T. Rodger, Echunga	106	194	
	107	197	
	108	dead	391
			812
	109	50	
	110	35	
	111	231	316
R. H. Smith, Yundi	112	31	
	113	146	
	114	77	254
			570
	115	66	
	116	111	
	117	178	355
Willow Bend Stud Poultry Farm, North Walkerville	118	—	
	119	79	
	120	162	241
			596
	121	28	
	122	125	
	123	202	355
C. MacDonald, Echunga	124	182	
	125	156	
	126	110	448
			803
	127	228	
	128	132	
	129	dead	360
T. R. Smart Yundi	130	124	
	131	dead	
	132	162	286
			646
	133	80	
	134	172	
	135	181	433
Raymoor Poultry Farm, William Street. Kilkenny	136	162	
	137	137	
	138	dead	299
			732
	139	104	
	140	162	
	141	260	526
B. R. Whittington. Yundi	142	144	
	143	99	
	144	193	436
			962
	145	7	
	146	242	
	147	159	408
W. A. Hazeal, 11, Rosetta Street. Rosewater	148	dead	
	149	164	
	150	dead	164
			572
	151	61	
	152	106	
	153	82	249
H. F. Muirson, Yundi	154	73	
	155	133	
	156	148	354
			603
	157	3	
	158	165	
	159	131	299
K. Pennack, Pooraka	160	210	
	161	99	
	162	191	500
			799
	163	117	
	164	164	
	165	185	466
C. A. L. Sandstrom, Yundi	166	223	
	167	160	
	168	62	445
			911
	169	78	
	170	105	
	171	97	280
G. A. Bielby, Pooraka	172	181	
	173	dead	
	174	dead	181
			461
	175	160	
	176	153	
	177	182	495
W. M. Field, Yundi	178	73	
	179	153	
	180	153	379
			874
	181	221	
	182	237	
	183	172	630
T. Duhring, Mallala	184	189	
	185	122	
	186	103	414
			1,044
	187	192	
	188	dead	
	189	84	276
W. R. Hedger. Yundi	190	109	
	191	228	
	192	dead	337
			613
	193	190	
	194	210	
	195	dead	400
A. & H. Gurr, Bradbury	196	217	
	197	210	
	198	206	643
			1,043
	199	206	
	200	91	
	201	154	451
J. V. McGinnis, Yundi	202	145	
	203	176	
	204	22	343
			794

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.	
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	221	
	206	179	
	207	219	619
	208	137	
	209	155	
	210	203	495
			1,114
W. C. Jones, Yundi	211	12	
	212	135	
	213	227	374
	214	118	
	215	187	
	216	76	381
			755
Langmaid & Bettison, Parafield, Salisbury	217	dead	
	218	145	
	219	73	218
	220	140	
	221	154	
	222	167	461
			679
A. Jarvis, Yundi	223	79	
	224	155	
	225	94	328
	226	158	
	227	146	
	228	211	515
			843
S. Eyles, Clarendon	229	79	
	230	dead	
	231	170	249
	232	53	
	233	223	
	234	168	444
			793
Woodbury Poultry Farm, Stirling East	235	128	
	236	17	
	237	194	339
	238	dead	
	239	66	
	240	dead	66
			405
V. F. Gameau, Findon Road, Woodville	241	85	
	242	6	
	243	139	230
	244	dead	
	245	96	
	246	138	234
			464
Geo. Lomax, Yundi	247	150	
	248	39	
	249	165	354
	250	dead	
	251	dead	
	252	69	69
			423
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	180	
	254	232	
	255	71	483
	256	21	
	257	14	
	258	29	64
			547

Competitor.	Bird No.	First Grade Eggs Progressive Totals. to March 31st, 1935.	
W. R. Williams, 28, Avenue Road, Frewville	259	246	
	260	93	
	261	dead	339
	262	158	
	263	226	
	264	231	615
			954
R. W. McAllister, Yundi	265	95	
	266	126	
	267	192	413
	268	117	
	269	214	
	270	144	475
			888
G. W. Sykes, Yundi	271	73	
	272	dead	
	273	139	212
	274	210	
	275	195	
	276	152	557
			769
A. P. Urlwin, Balaklava	277	228	
	278	189	
	279	204	
		621	
A. V. Dupen, Melton Street, Glenelg	280	211	
	281	233	
	282	135	
		579	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	105	
	284	219	
	285	169	
		493	
Thomas & Elson, Clifton Street, Hawthorn	286	165	
	287	95	
	288	166	
		426	
J. H. Dowling, Glossop, River Murray	289	134	
	290	204	
	291	201	
		539	
E. Pape, Wynarka	292	dead	
	293	27	
	294	163	
		190	
L. S. Ekers, Mount Jagged Farm Mount Compass	295	182	
	296	148	
	297	185	
		515	
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	214	
	299	207	
	300	224	
		645	
L. R. Badcock, 77, Findon Road, Woodville	301	120	
	302	99	
	303	139	
		358	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.	
W. H. A. Hodgson, Commercial Road, Salisbury.	304	131	
	305	201	
	306	229	
		561	
Gallagher & Aslin, Pooraka	307	193	
	308	195	
	309	170	
		558	
R. C. Crittenden, William Street, Kilkenny North	310	218	
	311	182	
	312	81	
		481	
C. H. Lines, Junr., Gladstone	313	167	
	314	206	
	315	211	
		584	
A. J. Monkhouse Woodside	316	203	
	317	117	
	318	72	
		392	
B. Cooke, Kanmantoo	319	224	
	320	250	
	321	228	
		702	
Total Class 1. ...		42,892	

Class 2.—Any Other Light Breeds.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	82
	323	5
	324	103
		190
G. Frisby Smith, Fulham (Minorcas)	325	dead
	326	dead
	327	161
		161
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	111
	329	205
	330	160
		476
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	85
	332	205
	333	150
		438
Total Class No. 2.		1,265

Class 3.—*Black Orpington.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.	
H. J. Mills, 108, Edward Street Edwardstown	334	214	
	335	95	
	336	210	519
	337	189	
	338	240	
	339	269	698
			1,217
A. G. Dawes Portrush Road, Glenunga Gardens	340	216	
	341	159	
	342	219	594
	343	179	
	344	152	
	345	173	504
			1,098
Willow Bend Stud Poutry Farm, North Walkerville	346	210	
	347	203	
	348	182	595
	349	191	
	350	92	
	351	118	401
			996
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	164	
	353	157	
	354	173	494
	355	117	
	356	219	
	357	*174	510
			1,004
A. C. Byrne, 114, Rose Terrace, Wayville West	358	140	
	359	136	
	360	123	399
	361	165	
	362	214	
	363	133	517
			906
W. R. Williams, 28, Avenue Road, Frewville	364	38	
	365	146	
	366	132	
		316	
C. H. Lines, jun. Gladstone	367	184	
	368	126	
	369	dead	
		310	
J. H. Dowling, Glossop, River Murray	370	108	
	371	148	
	372	dead	
		256	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	190	
	374	186	
	375	206	
		582	
Mrs. M. Specht, Holder Avenue, Richmond	376	208	
	377	187	
	378	178	
		573	
W. Rentoul Christie, Claremont Avenue, Mitcham	379	130	
	380	191	
	381	97	
		418	
G. Frisby Smith, Fulham House, Fulham	382	156	
	383	35	
	384	124	
		315	
B. Cooke, Kanmantoo	385	227	
	386	198	
	387	193	
		618	
Total Class No. 3.			8,609

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive to March 31st, 1935.	Totals
Class No. 4.—Any other Heavy Breed.			
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388	152	
	389	179	
	390	105	436
	391	170	
	392	119	
	393	195	484
			920
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394	153	
	395	210	
	396	223	586
	397	176	
	398	55	
	399	170	401
			987
E. F. Snow, 18, Mt. Barker Road Glen Osmond (Rhode Island Reds.)	400	83	
	401	133	
	402	229	
		445	
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403	149	
	404	165	
	405	206	
		520	
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406	71	
	407	180	
	408	178	
		429	
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409	170	
	410	149	
	411	153	
		472	
K. Pennack, Pooraka (Barnevelders.)	412	195	
	413	179	
	414	204	
		578	
Total Class No. 4.		4,351	

FINAL SCORES—SECTION 2.—DRY MASH.

Class No. 5—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive to March 31st, 1935.	Totals
l. O. Dawkins, Gawler	415	182	
	416	180	
	417	84	446
	418	195	
	419	226	
	420	183	604
			1,050
.. V. Dupen, Melton Street, Glenelg	421	64	
	422	dead	
	423	202	
		266	
A. J. Monkhouse, Woodside	424	207	
	425	166	
	426	202	
		575	
Total Class No. 5.		1,891	

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive to March 31st, 1935.	Totals
A. C. Byrne, 114, Rose Terrace, Wayville West	427	125	
	428	127	
	429	166	418
	430	92	
	431	164	
	432	180	436
			854
G. Frisby Smith, Fulham House, Fulham	433	207	
	434	130	
	435	120	
		457	
Total Class No. 7.		1,311	

Home Project Utility Section.—Wet Mash.

Competitor.	Bird No.	First Grade Eggs. Progressive to March 31st, 1935.
John Plummer, Virginia School	436	192
Dudley Harper, Murray Bridge School	437	101
Jack Beauchamp, Murray Bridge School	438	155
Jack Beauchamp, Murray Bridge School	439	115
George Bielby, Abattoirs School	440	dead
Eric Pratt, Abattoirs School	441	247
Stanley Pratt, Abattoirs School	442	215
Mervyn Steer, Sturt School	443	190
Donald Wolford, Westbourne Park School	444	155
E. Zbierski, Gawler School	445	dead
J. McInerney, Gawler School	446	85
F. Martin, Gawler School	447	217
Darcy Coleman, Mallala School	448	188
Kevin Angus, Mallala School	449	79
Alwin Scott, Wellington Road School	450	185
Jack Dietman, Wellington Road School	451	125

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.
Milton Smith, Salisbury School	452	189
Owen Robinson, Ascot Park School	453	175
Paul Mundy, Urrbrae High School	454	125
Max Couche, Thebarton School	455	224
Robert Swift, Murray Bridge School	456	dead
Bruce Dooland, Thebarton Central School	457	dead
Ian Slee, Two Wells School	470	180
Total		3,142

All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

Competitor.	Bird No.	First Grade Eggs.
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	262
	459	240
	460	230
		732
		1,314

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Class No. 4.

Competitor.	Bird No.	First Grade Eggs.
G. W. Lindsay, Torrens Road, Kilkenny (Langshans.)	461	48
	462	104
	463	199
		351

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to March 31st, 1935.
Class No. 1.		
Gallagher & Aslin, Pooraka	464	169
	465	207
	466	174
		550

The above birds are White Leghorns and, together with Nos. 307 and 309, will constitute a team in this class.

Competitor.	Bird No.	First Grade Eggs.
W. C. Slape, Magill	467	141
	468	183
	469	—
		324
Class No. 2.		
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	26
	472	152
	473	186
		364
Class No. 1.		
Willow Bend, Stud Poultry Farm, North Walkerville	474	234
	475	7
	476	221
		462
	477	dead
	478	239
	479	233
		472
		934
Willow Bend, Stud Poultry Farm, North Walkerville	480	186
	481	196
	482	238
		620
	483	119
	484	177
	485	216
		512
		1,132

DEPARTMENT OF AGRICULTURE.

FINAL SCORES.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED 31ST *MARCH*, 1935.—
FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—*White Leghorns.*

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	274	39
B. R. Whittington	260	141
J. O. Marshal	251	86
Trios—		
B. Cooke	702	319–321
V. E. Williams	645	298–300
A. & H. Gurr	643	196–198

D

Teams—

A. G. Dawes	1,114	205–210
Gallagher & Aslin	1,108	307–309 and 464–466
A. Young	1,081	61–66

Class 2.—Any other Light Breed.

Singles—

A. Heaysman (Cuckoo Leghorn)	205	332
V. F. Gameau (Minorcas)	205	329
Langmaid & Bettison (Minorcas)	186	473

Trios—

V. F. Gameau (Minorcas)	476	328–330
A. Heaysman (Cuckoo Leghorns)	438	331–333
Langmaid & Bettison (Minorcas)	364	471–473

Class 3.—Black Orpingtons.

Singles—

H. J. Mills	269	339
F. F. Welford	262	458
F. F. Welford	240	459
H. J. Mills	240	338

Trios—

F. F. Welford	732	458–460
H. J. Mills	698	337–339
Willow Bend Stud Poultry Farm	620	480–482

Teams—

F. F. Welford	1,314	373–375 and 458–460
H. J. Mills	1,217	334–339
Willow Bend Stud Poultry Farm	1,132	480–485

Class 4.—Any other Heavy Breeds.

Singles—

E. F. Snow (Rhode Island Reds)	229	402
A. G. Dawes (Rhode Island Reds)	223	396
A. G. Dawes (Rhode Island Reds)	210	395

Trios—

A. G. Dawes (Rhode Island Reds)	586	394–396
K. Pennack (Barnevelders)	578	412–414
W. R. Williams (Rhode Island Reds)	520	403–405

Teams—

A. G. Dawes (Rhode Island Reds)	987	394–396
A. G. Dawes (Rhode Island Reds)	920	388–393

SECTION 2.—DRY MASH.

Class 5.—*White Leghorns.*

Singles—

A. O. Dawkins	226	419
A. J. Monkhouse	207	424
A. J. Monkhouse	202	426
A. V. Dupen	202	423

Trios—

A. O. Dawkins	604	418–420
A. J. Monkhouse	575	424–426

Teams—

A. J. Dawkins	1,050	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	207	433
A. C. Byrne	180	432
A. C. Byrne	166	429
Trios—		
G. Frisby Smith	457	433–435
A. C. Byrne	436	430–432
Teams—		
A. C. Byrne	854	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Eric Pratt, Abattoirs (White Leghorn) . ..	247	441
Max Couche, Thebarton (Rhode Island Red)	224	455
F. Martin, Gawler (White Leghorn)	217	447
Stanley Pratt, Abattoirs (White Leghorn) ..	215	442

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 *Test.*—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 *Test.*—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.

No. 3 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 *Test.*—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½ lb. meat meal, 50 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 *Test.*—Morning—1½ozs. wheat per bird.
Evening—1½ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to March 31st, 1935.

These tests terminated on 31st March, 1935, and a full report will appear in this *Journal* in due course.

	No. Eggs Laid April 1st, 1933, to Feb. 28th, 1935.	No. Eggs Laid Month of March, 1935.	Total Eggs Laid April 1st, 1933, to March 31st, 1935.
No. 1 test	13,866	346	14,212
No. 2 test	12,757	239	12,996
No. 3 test	12,412	338	12,750
No. 4 test	13,600	254	13,854

THE STATE EXPERIMENT ORCHARD, COROMANDEL VALLEY, NEAR BLACKWOOD, SOUTH AUSTRALIA.

[By GEO. QUINN, Chief Horticultural Instructor.]

(*Continued from page* 987.)

ROOTSTOCKS.

Cherry, Peach, and Pear.

If the fig and the olive trees—which are usually grown from branch cuttings and occasionally from natural stools or offsets arising from the stem of the parent at or immediately below ground level—be omitted, all of the commercial varieties of the 15 different kinds of tree fruits contained in the collections in this orchard are reproduced in nurseries by means of grafting a segment or "scion" of the sort desired on to a suitable rootstock.

Even the most valued of the named sorts of walnuts are, owing to the development of improved technique, now being raised in this manner in commercial numbers in the open nursery beds by a local nurseryman in South Australia.

Expressed in simple terms, any form of plant grafting may be defined as "uniting a scion to a rootstock."

A "scion" may consist of a piece of living bark carrying one live bud only, or it may comprise a living twig on which several dormant buds are present. In technical terms, the grafting operation relative to the former is referred to as "budding," and in respect to the latter as "grafting."

A "rootstock" or "stock," as it is more often termed by nurserymen and fruitgrowers, may consist of a piece of a root, a complete root system, or a rooted plant—whether consisting of a seedling or segment only, but which has already established a separate root system capable of absorbing mineral solutions from the soil.

The functions which a scion is destined to perform in the economy of a fruit tree are—(1) to give rise to a stem and branch system or "head" carrying the foliage and ultimately the flowers and fruits; and (2) through the agency of its green parts to secure carbon from the atmosphere, and to elaborate all necessary tree building and sustaining properties from that element when it is utilised in conjunction with the constituents in the crude solutions received from the soil *via* the root system.

The functions of the rootstock are obviously also of a twofold nature—(1) to develop a root system capable of anchoring the tree firmly into the soil, and (2) to ramify the soil body sufficiently with its absorbing root fibres, and thus secure and transmit through the stem to the foliage an adequate supply of soil moisture in which the required mineral plant food substances are dissolved.

It will be seen, therefore, that in uniting a scion with a stock, two separate entities are brought together, and in view of the reciprocal activities they are called upon to perform, if the union is to be productive of lasting good, a high degree of compatibility between them is essential in this unique form of non-sexual union.

It may be claimed, therefore, that to enable a permanently satisfactory union to take place, the closest botanical relationship must exist between the parent plants from which both the scion and the stock originate. There is no doubt it has been due to the general acceptance of this fact, that nurserymen and horticulturists in all countries have, by common consent, grafted peach on peach, almond on almond, apricot on apricot, plum on plum, and cherry on cherry as standard practice.

Although botanists may class all of the above fruit trees as representing merely different species of the genus *Prunus,* and horticulturists have found that scions and rootstocks of most of them may unite and grow for varying periods of time, yet that intimate symbiotic relationship which is necessary to the maintenance of a successful and prolonged union does not appear to exist between most of them. Occasionally, however, exceptions seem to arise which leads one to the view that this lack of sufficient compatability between all of the varieties of some of these so-called species may not prove to be a fixed and definite characteristic.

There is probably no other phase amongst the many commonly accepted horticultural practices upon which research on scientific lines has been more closely focussed during the past 10 to 15 years than that which centres around the relationship existing between rootstocks and scions.

Most of this research work, both in Great Britain and America, has had reference to rootstocks used in the propagation of apple trees. Latterly, however, some attention has been turned towards the study of the selection and vegetative propagation of rootstocks used in the production of plum, pear, and cherry trees.

Whilst in America and Canada seedling rootstocks have been in general use from the inception of the great apple growing industries of those countries, in Great Britain and the western portions of the European Continent, vegetatively raised apple rootstocks have been largely used in conjunction with seedling stocks of the "crab," and so-called "free" types. These vegetatively produced stocks have been used in what may be termed more specialised forms of apple culture which have prevailed in these older countries where land was restricted and costly, but labour cheap.

In France and Britain, particularly, to suit these limited areas, apple trees have been grown in dwarfed form, as bushes, cordons, and half-standards. When grown as full standards set out in orchard areas, the more vigorous seedling "free" stocks have been used. To meet the demand for trees which assume various sizes, types of apple trees claimed to be possessed of a naturally diminutive stature, the varieties of which have become known by quasi specific names of "Paradise" and "Doucin," have been long used as rootstocks. Certain forms of these had been selected because they also displayed inherent tendencies of free rooting, and thus lent themselves readily to vegetative forms of reproduction—a very necessary point in the commercial propagation of rootstocks.

When Hatton and his co-workers at the East Malling Research Station of the Kent Incorporated Society for Promoting Experiments in Horticulture began to collect these variously named types of apples used for rootstock purposes, they discovered that much confusion existed in respect to the nomenclature as well as to the assumed characteristics of growth attached to these varieties. After much painstaking botanical study and testing had been carried out in the field on all the available sorts, this confusion was finally straightened out and a selection made of the kinds of apples which, under most searching trials, had been demonstrated to possess certain definite rooting characteristics. It is claimed that in Britain, these characteristics of the various rootstock types selected at the East Malling Research Station remained absolutely distinct, whatever the normal strength of growth of the scion variety worked upon them may have been, or the nature of the soil in which they were grown.

These apple rootstocks, which have been tested so thoroughly, have each been vegetatively raised from segments of a selected tree, and are, in consequence, all of a true clonal nature or strain ([1]). They have been

classed by the selectors under the following designations, and each type is claimed to exercise its influence on the growth of the scion varieties worked upon it in the direction respectively set forth hereunder:—

Group (*a*) ..	Very dwarfing	No. VIII.	French Paradise.
		No. IX.	Jaune de Metz Paradise.
Group (*b*) ..	Semi-dwarfing	No. II.	Doucin (English Paradise).
		No. V.	Doucin Ameliore (Improved Doucin).
Group (*c*) ..	Vigorous stock	No. I.	Broadleaf English Paradise.
		No. VI.	Nonsuch (River's Paradise).
Group (*d*) ..	Very vigorous stock ...	No. XII.	Layer raised Free Stocks.
		No. XIII and XVI..	Layer raised Free Stocks.

Although environmental conditions may increase or diminish their health or vitality, or being united to a very vigorous scion variety may also act to a certain degree in the first named direction, yet any morphological characteristics such as a vertical or deep rooting, or a more slender or fibrous or shallow rooting habit is not changed. That the quality conferring immunity or high resistance to the attacks of a certain pest, viz.: Woolly Aphis is not changed by the scion variety, is instanced by the continued use of the Northern Spy apple as a rootstock in Australia.

Providing such clonally raised rootstocks, when being selected from the propagation beds, are carefully graded in respect to such matters as even and healthy development in roots and tops, the chances of achieving great uniformity of growth on the part of any scion variety grafted upon them has been amply demonstrated. Whilst this feature holds many advantages for the commercial fruit-grower, it is now recognised as being absolutely fundamental in importance to the research worker who desires to eliminate all possible variable plant factors such as may arise from the use of rootstocks possessing unknown characteristics.

After beginning to experiment with the Winter Majetin variety—an old Norfolk apple—as early as 1869 at Ballarat, Victoria, it is now about 60 years since Australian Nurserymen systematically began using a type of vegetatively raised clonal rootstock—the Northern Spy—on which to propagate all kinds of apple trees. For several years, the trees were raised by grafting a piece of a root of this American variety on to a shoot of the desired scion variety. As this form of single grafting involved the burying of the base of the shoot of the scion variety under the soil, roots were emitted from it and ultimately discarding the nursing roots of the Northern Spy, the object, which was the elimination of the root inhabiting form of the Woolly Aphis, failed. This method was then superseded by what is known as "double working."

This consisted of grafting a scion of the Northern Spy into a piece of root of its own kind, and on the stem or resulting shoot from this combination, the desired scion variety was budded or grafted several inches above the surface of the ground, or at such a height as to preclude any possibility of the scion variety becoming self-rooted.

This rootstock was adopted in Australia purely because of the immunity it enjoys from the attacks of the subterranean form of the Woolly Aphis or American Blight (*Eriosoma lanigera*, Hausm), which in this country proves extremely injurious to the roots of young apple trees, and more particularly so during their nursery stages. During the past half century, 95 per cent. of the millions of apple trees propagated in Australian nurseries have been raised as described above, either on "double worked"

Northern Spy rootstocks, or simply stem-worked on rooted sprouts from horizontally layered Northern Spy trees. The Northern Spy variety secured early preference for rootstock purposes over Winter Majetin, and other seemingly equally Woolly Aphis resistant varieties which were tried at the time, because, like the selected Paradise strains of Britain, it possessed very free rooting characteristics, and thus proved a good proposition for the immediate furtherance of the nurseryman's objective.

During the last few years, since the apple growing industry of Australia has become widely spread, and reaching out into soils and climatic zones not quite fulfilling all of the requirements of the apple tree, complaints have arisen in some localities against the shallow fibrous rooting characteristic of this rootstock.

As previously indicated, it has not lost its immunity from the attacks of the Woolly Aphis, nor has its capacity to emit abundance of fibrous roots diminished through constant repetitions of vegetative forms of reproduction, but it cannot thrive in shallow or dry soils, nor can its fine roots penetrate the stiff tenacious clay subsoils so commonly found in many of the apple growing districts of the various States.

It would seem, therefore, that whilst the type of rootstock most desired to supplant it must possess deep, strong rooting characteristics, it must still retain the desirable free rooting and aphis resisting qualities of the Northern Spy.

The clonal rootstocks developed at East Malling in Britain for apple, plum, pear, and cherry trees have now been distributed almost throughout the world, and several of the Australian States have procured practically all of the selected series. Through exchanges of scions of other varieties of fruit trees from the Blackwood State Collection, the writer has succeeded in securing from the other State Horticultural Divisions, most of the East Malling types. These are now being vegetatively propagated in the nursery at the Blackwood State Orchard. It is too much to hope that they all will prove equally satisfactory in this climate, as they are claimed to have proved in Britain, but further tests may lead to some of them, at any rate, meeting our requirements more effectively than some of the rootstocks now in use.

Notwithstanding the success achieved by the Chalcid parasite (*Aphelinus mali*) against the branch inhabiting form of the Woolly Aphis, the writer deems that this blight proof quality in the rootstocks used for apple trees is highly valuable, if not absolutely indispensable, in this country with its mild winter and warm spring climate. Genetically, the vegetatively propagated rootstock must possess greater uniformity of composition and habit as compared with the seedlings in common use, and which have usually arisen as the result of the fusion of male and female elements from the flowers of varieties widely differing in such characters. Recognising this fact, the writer, with the assistance of the District Horticultural Instructors, and the cordial co-operation of nurserymen and orchardists, has brought together at the Blackwood State Orchard nursery about half a dozen seemingly varying strains of the Northern Spy apple as found in this State, also some eight types of seedling Myrobalana plums. These are being propagated vegetatively in sufficient numbers for subsequent observation and testing. Any which may display characteristics of an outstanding and desirable nature, may be then worked with scions of known commercial varieties and further tested.

With the exceptions of the Northern Spy apple, and the occasional use of the so-called Angers quince, practically all of the rootstocks used in

Australian nurseries—and in the experiments in the Blackwood State Orchard also—have been raised from seeds of various and often unknown kinds of the different fruit trees.

It cannot be denied, however, that in spite of this latter fact—as Dr. Swarbrick, of the Long Ashton Agricultural and Horticultural Research Station of the University of Bristol, states of the American apple orchards which have been worked on seedling rootstocks (2) that in Australia there are vast numbers of orchards composed of trees of apricot, peach, plum, almond, and citrus fruits of various kinds, which have developed with remarkable uniformity notwithstanding that they have all been raised on seedling rootstocks. This would indicate in respect to the stone fruits, at any rate, that given appropriate conditions and good cultural attention, a high degree of uniformity would seem possible of achievement from seedling rootstocks provided always that equal care and rigidity be applied to the culling out of inferior or weak types of plants from the seedbed onwards throughout the nursery lifetime of the trees in question.

The polyembrionic characteristics of the seeds of members of the citrus family, and as a consequence, the more or less unsuspected use of a great number of asexually developed seedling rootstocks by this means, may yet be found to exercise an important influence in the uniformity of growth noted in these last-named trees.

(1) Hatton, R. G., Journal of Pomology and Horticultural Science, Vol. IX., 1931, page 266.

(2) Swarbrick and Roberts' Wisconsin Agricultural Experiment Station Research Bulletin 78 of 1927.

ROOTSTOCKS.

For Cherry Trees.

In South Australia, the cherry is considered to be the most fastidious of all the stone fruit trees in respect to its adaptability to the varying combinations of soils and climates found throughout most of the fruit-growing areas in the State.

It delights in deep, well drained soils, rich in organic matter. Combined with this, a heavy winter rainfall, a reasonably cool, dry atmosphere during spring and summer, together with shelter from rough, cold, cutting winds are all equally desirable. In this State, these comparatively ideal conditions are found over a limited area only, in the Mount Lofty Ranges. This is situated directly east of the City of Adelaide, and it stretches northwards from Mount Lofty through Uraidla, Norton's Summit, to Cherryville and Montacute, extending eastwards, taking in Basket Range, and adjacent country between.

It is true in other parts of this range where the annual rainfall approximates between 30in. and 35in. fairly good cherries are grown in selected spots. Further north, in sheltered valleys through the hilly country around Angaston and Clare, the Kentish and Morello types of cherry (varieties of *Prunus cerasus*, Linn.) thrive fairly well. In the lower South-Eastern portions of the State, especially in wind-sheltered positions and where the soil is moist and never water-logged in winter, quite good quality sweet cherries (varieties of *Prunus Avium*, Linn.) have been grown. Usually, however, in these South-Eastern localities, the soil is shallow and the trees do not grow to large dimensions, whilst in moist, humid spring seasons, the ripening fruits are liable to be attacked by the brown rot fungus (*Sclerotinia fructicola*).

In the above described most favoured portion of the Mount Lofty Ranges, many varieties of sweet cherries have been successfully grown for a period approximating to three-quarters of a century. It is claimed that there are few parts of the world capable of producing cherries of a bolder and better quality than those grown on some of the very steep hillsides in the narrow sheltered valleys which intersect this portion of the Range. The soils covering the best slopes are of great depth and richness.

Where the hardy pioneer settlers have, with infinite labour, cut their winding roadways around the faces of these slopes, thus descending to the lower levels on a reasonably graduated course, the soil profiles may be studied as readily as the pages of an opened book. Here, in many places, from 2ft. to 3ft. of friable loam overlie a crumbly, deep clay into which is blended a mixture of fragments of soft, shaly slate and quartzite rock—the whole being deeply iron-stained.

This steep land, which annually produces a heavy crop of naturally sown vegetation, embodying clovers, wild vetches, and other legumes amongst its grasses, and more succulent herbage, is, of necessity, hand worked by means of heavy pronged hoes. This tillage is applied in early spring time when the herbage often has to be mown ahead of the workmen who skilfully turn the soil and incorporate the whole of this self-sown crop into the land. This procedure, followed from year to year, has created a rich humified surface soil which holds moisture, but does not suffer by erosion in the same manner after heavy summer rain-storms, as do the less humified surfaces of slopes found in many other parts of these ranges —including Coromandel Valley—where the soil body has been formed from similar types of the original rocks. In some of the old orchards, a wealth of information which has been accumulating over many years, may be found relative to the behaviour of numerous varieties of sweet cherries which have been grafted on various rootstocks and planted irregularly and at random in different aspects along the curving faces of these slopes.

At the time the State Orchard was inaugurated, from a study previously made of the question amongst these cherry orchards, the writer was assured that three distinct species of cherries (*Prunus*) were being used in this State as rootstocks for the popular varieties of sweet cherries.

These consisted of:—

1. The Mazzard, or Black Mazzard, or Bird Cherry of Britain (*Prunus avium*, Linn.).

Recorded in horticultural literature as being originally indigenous to Eastern Europe and extending into the western portions of Asia in the vicinity of the Caspian Sea, and as far as northern India, it is now found wild throughout Western Europe and the British Isles.

This species resembles, and is claimed by botanists to be the original form from which the present sweet cherries ascended. The tree is reported by Hedrick to have established itself in the eastern States of America where it reaches a height of from 30ft. to 40ft. in the woodland glades. (U. P. Hedrick, "Cherries of New York," page 41.) It is stated by that author to be less resistant to cold—as experienced in eastern America—than the sour cherry or the scented cherry, and is very susceptible in the nursery rows to the attacks of a shot-hole fungus (*Cylindrosporium padi*), the suppression of which adds considerably to the cost of raising trees on it as a rootstock. Here, fortunately, these latter characteristics prove of minor importance. It is also claimed that records exist showing that

its use as a rootstock for sweet cherries was understood by the Greeks and Romans upwards of at least a century before the Christian era began. The habit of growth of this tree, together with the colour of its bark, its conspicuous flowers, and bold, dark-green, deeply serrated foliage makes it somewhat difficult to distinguish from many of our cultivated varieties of sweet cherries. The fruits, however, are quite small and black when ripe, and have a rather harsh, astringent flavour—even when dead ripe. The writer has found that a very low percentage of the seeds from locally grown Mazzard fruits are germinable. The rootstocks of this tree used by local nurserymen up till comparatively recent years arose from seeds imported from Europe—chiefly from France. Of later years, it is claimed this seed has also proved to give poor results, and resort has been made to the use of suckers naturally developed from the older plantations growing on seedling Mazzard rootstocks. These are actually root cuttings, or

Mazzard Cherry (*Prunus avium*, Linn.).

[After Hedrick.]

stools arising where roots have been lacerated or broken in the tillage operations. Although originally decried as a stock, sweet cherry trees worked on them may now be seen growing in the orchards alongside others on seedling Mazzard rootstocks, and thus far, doing equally well in every respect.

The old bias, which asserted that the suckering habit would be intensified in the resulting tree, has not, to the writer's observation, been verified. The local cherry growers call these "seedling suckers"—a somewhat involved, yet accurate description.

In Europe, America, or Australia, wherever this rootstock has been worked over to sweet cherry varieties, it is reputed to make an excellent union, and if the conditions of soil and climate are favourable, a very

strong vigorous tree results. This habit of growth is claimed to have postponed the arrival of the fruit bearing period for many years. (The researches of recent years into the varying pollination requirements of the different varieties of sweet cherry trees may be found, however, to have an important bearing on this phase of the matter.) At the same time, when the sweet cherry trees worked upon this stock reach a fruiting age, the quality of the fruit has usually proved superior to that of the same varieties grown on other stocks, and the quantities borne have been greater.

The long period of waiting, however, caused cherry growers in this and in other States and countries to seek other rootstocks deemed more capable of inducing lesser vigour and an earlier cropping habit in the varieties worked upon it.

Mahaleb Cherry (*Prunus Mahaleb*, Linn.).

[After Hedrick.]

2. The Mahaleb, or Scented Cherry (*Prunus Mahaleb*, Linn.).

This species of prunus is also recorded to have been originally a native of eastern Europe and Western Asia, but has spread farther west into Europe, following the course of plant dissemination movements during more recent centuries than the preceding species. It is a slender growing, bushy tree, bearing masses of small, green, smooth, glossy leaves, more comparable in many respects to those of the smaller leaved types of apricot foliage than to that of the other well-known species of cherry.

The fruits which approximate to the size of a garden pea seed quickly pass from green to yellowish red, and finally, when fully ripe, assume a shiny black colour. They are hard, bitterly astringent, and not at all palatable. The bark of the tree has a pale, smooth, brownish colour tone, quite distinct from that of other well-known species of the cherry family. Although recorded in Britain early in the 18th century, as an ornamental

lawn tree only, in France later in that century, its use was advocated by Duhamel du Monceau as a stock for sweet cherries. It was not until early in the 19th century when Loudon, in the "Encyclopaedia of Gardening," first referred to it as "the most effectual dwarfing stock for sweet cherries," that notice was taken of it. Acording to Loudon, the French horticultural writer Dubrueil commended it for use "in soils of a light, sandy, or chalky nature," but Thomas, an American writer, on the other hand, in the "American Fruit Culturist," in 1849 declares that it "possesses the advantage of flourishing in heavy clay land," a statement scarcely supported by our experience at Blackwood State Orchard, as outlined herein. Hedrick in "Cherries of New York," page 32, states, "Wild or cultivated, the Mahaleb is a shallow rooted plant, a fact which must be taken into consideration in its use as a stock."

The writer is unable to indicate when this rootstock was introduced into Australian nurseries, but a few seemingly very old trees may be found under favourable conditions still existing in old-established orchards in the Mount Lofty Ranges in this State, which are claimed by the owners to have been propagated on Mahaleb rootstocks. In the writer's opinion, although unable to find the peculiar foliage of this species, these tree trunks bear the malformation characteristic of the point of union produced by the fusion, or limited degree of fusion, of this rootstock with the sweet cherry varieties.

The Mahaleb nursery stocks used in this State have been raised from seeds imported from French sources. The damaged roots of this species do not, as far as the writer's observations go in this climate at any rate, send up suckers so freely as either the Mazzard or the Kentish species; though in excavations depicted herein, it was found that at Blackwood suppressed suckering evidently existed to some extent from the damaged roots of this stock. Offsets or stools arise freely around the stock immediately below its point of union with the scion variety, and on mature trees these stunted shoots soon produce flowers.

European writers have freely recommended its use as a dwarfing stock for sweet cherries in preference to the Morello or sour cherry, owing to the paucity of its suckering habit. Hatton recommends it should be propagated for stock purposes by using green softwood cuttings off the young growth—presumably rooting them in propagating frames.

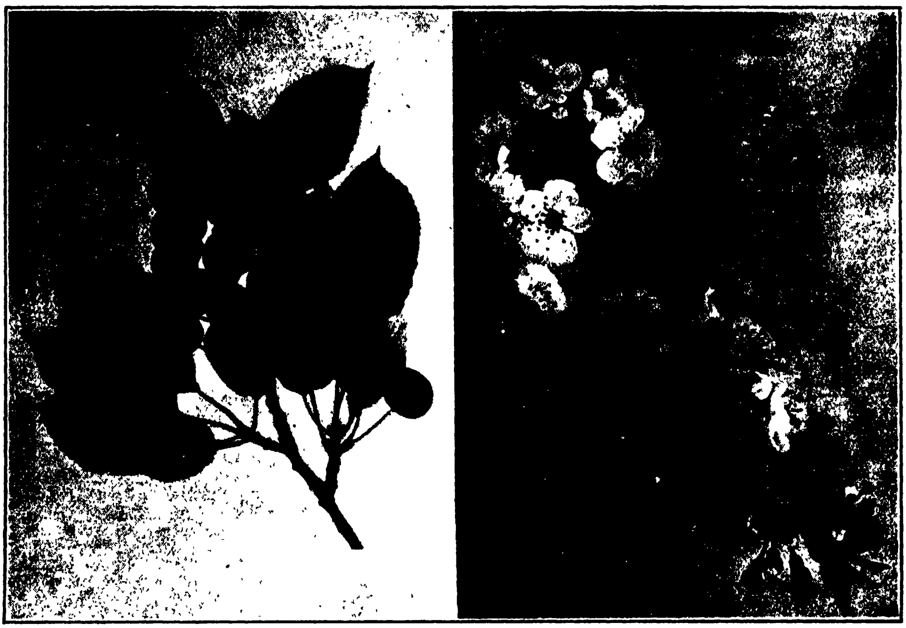
It is stated by Hedrick that the use of this rootstock made great headway in America from 1850 onwards, and at the time of the publication of his illuminating work, "The Cherries of New York," in 1915, he claims that "probably 95 per cent. of the cherries grown in this country are budded on the Mahaleb." The reasons for this may appear somewhat obscure, unless the context is quoted. "There is no question," he states, "but that it is much easier to grow cherry trees on Mahaleb stock in the nursery, than on Mazzard, and usually, a *better looking tree* can be delivered to the fruitgrower on the first-named stock. Seedlings of both stocks are imported from Europe and those of the Mahaleb are usually cheaper."

He further claims that the Mahaleb is less fastidious in respect to soils, climatic, and tillage attentions, and is also less troubled in the nursery by certain common insect pests and fungus diseases. Hedrick proceeds further: "Fruitgrowers on one side hold that the Mazzard is the best stock for all orchard varieties of this fruit, while nurserymen controvert this view, and say that the Mahaleb is at least a fit stock for sweet sorts,

and is the best for the sour cherries, which are very largely grown in America, and moreover, it is now impossible to grow cherry trees on Mazzard roots at prices that fruitgrowers are prepared to pay.'' In the light of local observations, the above quotations are illuminating, revealing as they do the viewpoints of the men who grow cherry trees for sale, and those who grow them for the sale of the fruit they produce. Such variations of opinion are not confined to American cherry growing interests.

3. THE KENTISH, MORELLO, PIE OR SOUR CHERRY (*Prunus cerasus*, Linn.).

The specific form of this cherry is also stated to be indigenous to South-Eastern Europe and South-Western Asia. Two groups have been erected from this species, one representing the bright red fruited form with almost colourless juice in the fruit, as represented by the English Kentish, or Pie cherry, and the other with dark fruits, having coloured juice, known as the Morello or Griotte. The former is the kind which has been used here at times as a dwarfing stock for sweet cherries. The tree has a



Kentish Cherry (*Prunus cerasus*, Linn.).

[After Hedrick.]

comparatively straggling bushy habit, the trunk and branches being smooth, and the bark reddish-brown, lightly tinted with a dull grey colour tone. The branchlets are slender, and as the tree develops, tend to become somewhat horizontal. The blossoms are usually borne on very short stalks on small bud spurs, and the bright red coloured, roundish, oblate-shaped fruits stand out on short stoutish fruit stalks. The flavour is acid, but not unpleasantly so when quite ripe.

This tree is scarcely ever cultivated in the best cherry growing districts of this State, but occupies odd corners and uncultivated spaces where, owing to the facility with which it sends up suckers, thickets form, unless some control is exercised from time to time. Whenever it is taken in hand here, it is almost purely as a dwarfing stock for the more vigorous sweet

cherry varieties. According to Hedrick, in the United States selected varieties of it are extensively grown and highly valued for kitchen purposes.

The labour of overcoming its inveterate habit of suckering, particularly during the earlier years of the growth of the trees worked upon it, has caused its rejection, probably more so than the extreme dwarfing influence it exerts on the scion varieties of sweet cherries.

The general impressions conveyed by the South Australian growers of cherries on the relative merits of these rootstocks and the writer's observations made amongst the cherry orchards in this State may be summarised somewhat on these lines.

The Mazzard rootstock displays a great measure of affinity with practically all of the varieties of cultivated sweet cherries. It forms, almost without exception, the basis of stout, vigorous growing, even stemmed, large trees. This vigour is believed to postpone the formation of fecund flowering spurs and, consequently, causes the trees to continue in an unpro-

[*E. W. Pritchard, Photo.*]

Bigarreau Napoleon on Mazzard rootstock.

ductive condition over a period of years, which inversely varies in length with the quality of the soil and climatic conditions appropriate to the welfare of the cherry tree.

The Mahaleb rootstock, somewhat contrary to the European and American claims, does not in this State, for a good many years, at any rate, appreciably dwarf the growth of the scion variety of sweet cherry worked upon it. It appears, however, that this early vitality begins to wane within probably the first ten years, and the tree soon after settles down to crop quite well. After cropping a few years, the restrictive or non-reciprocal action of the stock begins to become apparent in the swollen nature of the ring along the line of union with the sweet cherry scion. It is also reflected in the erratic dying back of fairly large upper branches in the tree's framework, and sooner or later, according to the environ-

mental conditions, the tree declines, and too frequently dies at an age when, to be profitable to the grower, it should be capable of yielding its largest crops.

The Kentish or Sour Cherry rootstock appears to give a fair start to the sweet cherry scion variety worked upon it, and provided the inherent suckering habit is rigidly suppressed during the first few seasons after planting the trees into the orchard, it continues to make good progress. Not many seasons, however, elapse before evidences of dwarfing become noticeable. and whilst the tree usually retains fair health, it generally comes to a standstill, and the terminals, or leading points of the limbs, die back slightly from time to time. The tree begins to crop in consonance with the above described recession of vigour, but the area of fruit-bearing wood is so limited that in the aggregate, the yield is low compared with

[*E. W. Pritchard, Photo.*]

Early Lyons on Mazzard Rootstock.

that of the same varieties worked on the other two first-named stocks. With closer grouping of the trees in the rows, the increased numbers planted per acre of land might compensate for the deficiency of the individual tree yields.

It was with these impressions before him that the writer planned what has been termed the "Cherry Stock Trials," which were set out in the Blackwood State Orchard in 1910. The object in view was to try to ascertain if the above-mentioned claims relative to the varying influences of these different rootstocks on the behaviour of the scion varieties worked on them could be substantiated when the varieties of the sweet cherries were grown side by side on the same plot of land. Further, being impressed with the uniformity of growth and good health of those trees of all ages stated to be growing on Mazzard rootstocks in the commercial cherry orchards in the Mount Lofty Ranges, the question of finding a solution of the problem of the deferred cropping habit of such trees was

also borne in mind. It was argued by the writer that, if the Kentish rootstock brought about a fruiting habit quickly by checking the too rapid extension of the top of the tree growing directly on it, would not a section or stem piece of Kentish origin superimposed on to the Mazzard rootstock also set up a similar re-action or effect on the vegetative activities of the scion variety finally worked upon the Kentish stem piece? A fourth series, embodying this combination, was therefore included in the trial.

A rectangular plot—including headlands or half-row widths—measuring 293ft. long by 83ft. wide, situated in a fairly sheltered position at the lower and western end of the orchard, was selected for the purpose. The longer sides of this parallelogram run east and west, with a fall westward equal to 29¾in. per chain on the upper or southern side, and 27½in. per

[*E. W. Pritchard, Photo.*]
Early Purple Guigne on Mazzard rootstock.

chain along the lower or northern side. The greater falls in the land are in a northerly direction along the end boundaries, equalling 82½in. per chain on the western end, and 81in. per chain on the eastern end of the rectangle.

The land was subsoiled to a depth varying between 12in. and 16in. The tree positions were arranged in four rows running the full length of the plot, and were distributed on the septuple system at 20ft. from each other. It will be noted that the steeper gradient runs northwards across these rows, and that the general surface of the block is reasonably even and regular on the two sloping faces.

Five of the then principal commercial varieties of sweet cherries were used, viz.:—Bigarreau Napoleon, Early Lyons, Early Purple Guigne, Florence, and St. Margaret's.

The different rootstocks were planted in parallel rows, the Mazzard occupying the top or first, Mahaleb the second, Kentish the third, and those for the combination Kentish on Mazzard being allotted the fourth, or the row lowest down the slope. The rootstocks of Mazzard and Mahaleb

were raised by a local nurseryman (Mr. H. Wicks, Sen.) from seeds imported from France, and those of the Kentish were stools obtained from a cherry grower in the Mount Lofty Ranges. As these cherry stocks were included in a large number obtained for general nursery operations, the most evenly grown plants available of each kind were picked out for this stock trial. They were budded in February, 1910, and to try to save a season, planted in position as dormant buds the following August (1910).

The bud wood of each variety was obtained from a selected tree of each kind in an orchard in the Mount Lofty Ranges. It will be seen, therefore, that apart from any variation which might occur in the seedling rootstocks, the trees were of reasonably uniform composition. Beginning at the eastern end of each row, the same order of planting the scion varieties was followed, viz.:—Three trees each of Bigarreau Napoleon, Early Lyons,

[*E. W. Pritchard, Photo.*]

Florence on Mazzard rootstock.

Early Purple Guigne, Florence, and St. Margaret's were set out in consecutive order. The modern method of randomizing the rootstocks had not then been adopted in the arrangement of horticultural experimental tests, but to try to make the positions as comparable as then deemed desirable, the respective scion varieties on all of the stocks were planted parallel to each other, the only difference being the slight variation in altitude of the rows in which they were placed. As a distance of only 52ft. separated the upper and lower rows, the variations in soil, aspect, and general shelter were reduced to a minimum. This order of planting certainly facilitated the forming of comparisons in respect to the growth, cropping, etc., of the different varieties when growing on the respective rootstocks.

Owing to the western end of this plot broaching upon the margin of a bed of surplus nursery stock, in the second or third year disaster overtook the trees of St. Margaret's variety worked on Kentish rootstocks and two

others of the same variety which were budded on the Kentish on Mazzard combination. This arose from a very sudden and virulent attack of the nocturnal leaf-eating Curculio Beetle (*Otiorrhynchus cribricollis*), which had bred up in destructive numbers amongst the thicket on this more or less neglected nursery plot. These injured trees subsequently died, and those worked up in their places have failed to reach dimensions entitling them to be included in this review. From some obscure cause, one tree of Florence variety worked on Kentish rootstock also died during the early stages of the trial, and the blank space remained unfilled.

A close examination of the soil profiles made in eight positions along the top row, in the centre between the second and third rows, and along the bottom row, indicated that the surface soil—a dark-brown non-humified clay loam—varied in depth between 5in. and 10in., averaging approximately 7½in. Under this, plastic clays varying in colour from a rather bright red to pale yellow, were found in a layer ranging from 13in. to 43in. thick. Amongst these clays, scraps of soft, shaly slate and quartzite

[*E. W. Pritchard, Photo.*]

St. Margaret's on Mazzard rootstock.

were freely mixed.. In one spot only, was a soft calcareous marl blended with the lower clay body. In a couple of the test holes a solid slate stratum was located approximately 25in. below the surface. This was in the lower western corner of the plot, where the country rock shelves towards the surface near the bottom of the slope. Most of the other test holes revealed no stone at 40in. to 50in. down. As subsequent excavations more fully verified, the roots of the oldest trees were mostly located below ploughing depth—about 5in.—down to approximately 16in. from the surface. The above description of the soil and subsoil indicates that in its present condition it is not ideal land for growing cherry trees. The surface loam is not only of insufficient depth, but is inadequately supplied with humus.

In very wet winters, the escape of surplus soakage water through the sublayers must be dangerously slow. This is evidenced by the premature decay of certain of the larger and deeper roots, as depicted in the sketches herein, relative to that phase of the subject.

INFLUENCE ON TRUNK AND BRANCH DEVELOPMENTS.

With the exceptions of the early failures of trees of the St. Margaret's and Florence varieties worked on Kentish rootstocks previously referred to, all of the trees in the plot made good progress and maintained a healthy, thriving condition, and began to crop in varying quantities and regularity from 1919 onwards. In November, 1923, when the trees had been planted 13 years, a series of photographs was taken showing the branch development of typical trees of the respective varieties growing on the various stocks. Short range photographs were also taken of the stems of the trees,

[*E. W. Pritchard, Photo.*]

Bigarreau Napoleon on Mahaleb rootstock.

showing the peculiarities of growth evolving from the respective points of union of scions and stocks at that time. These are very clearly indicated in the reproductions accompanying this report. On two of these, an inset shows the same tree stems photographed in 1934—eleven years later. During the same month—November, 1923—measurements were made of the full height and mean spread of each tree. The latter was determined by making several transverse horizontal measurements with a long graduated pole through the broadest part of the branch spread.

In the case of the trees on the Mazzard stocks, this greatest width was found between 9ft. and 10ft. above ground level. The trees on Mahaleb and Kentish rootstocks were gauged at a height between 8ft. and 9ft., and those on the Kentish Mazzard combination at approximately 9ft. above the ground.

Stem measurements were also taken in November, 1923, of the girth or circumference around the rootstock, the point of union of stock and scion, and around the true tree stem approximately 6in. above the point of union. In the case of the combination—Kentish on Mazzard—the girths of the inserted Kentish stem piece, and of its union with the scion variety, were also taken. The average of each of these stem measurements of each of the varieties grown on the respective rootstocks, together with the average of their total heights and mean spreads, are seen in Table A:—

TABLE A.—*Tree Measurements, Compiled November*, 1923.

Rootstock.	Average Height.	Average Spread	Average Girth of Rootstock.	Average Girth of Union.	Average Girth of Tree Stem.	Average Girth of 2nd Union.	Average Girth of Tree Stem above 2nd Union.
	Ft. Ins.	Ft. Ins.	Ins.	Ins.	Ins.	Ins.*	Ins.
			Scion Variety.—Bigarreau Napoleon.				
Mazzard	15 2	13 0	$27\frac{5}{6}$	$25\frac{3}{4}$	$23\frac{1}{3}$	—	—
Mahaleb	15 2	13 0	$27\frac{1}{2}$	$30\frac{2}{3}$	$26\frac{2}{3}$	—	—
Kentish	12 2	11 0	$15\frac{5}{6}$	$18\frac{1}{2}$	$16\frac{1}{2}$	—	—
Kentish on Mazzard	15 8	13 1	$27\frac{1}{3}$	$23\frac{1}{6}$	$20\frac{5}{6}$K	$24\frac{1}{2}$	$23\frac{5}{6}$
			Early Lyons.				
Mazzard	17 6	16 8	$30\frac{1}{3}$	$29\frac{1}{2}$	$27\frac{5}{6}$	—	—
Mahaleb	12 4	8 10	23	$23\frac{2}{3}$	$18\frac{2}{3}$	—	—
Kentish	14 6	13 10	20	21	$19\frac{1}{3}$	—	—
Kentish on Mazzard	15 6	15 2	$33\frac{2}{3}$	$28\frac{1}{2}$	$22\frac{5}{12}$K	$25\frac{2}{3}$	$23\frac{7}{12}$
			Early Purple Guigne.				
Mazzard	17 6	15 0	30	29	28	—	—
Mahaleb	14 8	12 4	$33\frac{2}{3}$	35	$22\frac{1}{6}$	—	—
Kentish	11 8	10 2	$15\frac{7}{12}$	$18\frac{5}{12}$	$14\frac{5}{6}$	—	—
Kentish on Mazzard	15 8	14 10	$30\frac{1}{2}$	$27\frac{2}{3}$	24 K	$26\frac{7}{12}$	$25\frac{1}{6}$
			Florence.				
Mazzard	16 8	13 4	$32\frac{1}{2}$	31	$29\frac{2}{3}$	—	—
Mahaleb	14 0	11 4	$28\frac{1}{6}$	$30\frac{2}{3}$	$24\frac{2}{3}$	—	—
Kentish	13 6	9 9	$13\frac{3}{4}$	$16\frac{7}{8}$	$15\frac{1}{4}$	—	—
Kentish on Mazzard	13 0	11 6	$24\frac{3}{4}$	21	19 K	21	$19\frac{1}{8}$ (2 trees)
			St. Margaret's.				
Mazzard	15 4	13 0	$28\frac{2}{3}$	27	$25\frac{1}{6}$	—	—
Mahaleb	10 10	11 2	$18\frac{2}{3}$	23	$19\frac{1}{2}$	—	—
Kentish	—	—	—	—	—	—	—
Kentish on Mazzard	10 0	9 0	$15\frac{1}{2}$	$18\frac{1}{2}$	17 K	20	17 (1 tree)

(K = Kentish stem piece.)

In November, 1934, 11 years later, a similar set of measurements was made, and the averages taken from these showed the increases, and decreases, as indicated in Table B.

TABLE B.—*Showing Increases and Decreases in Dimensions from* 1923 *to* 1934 (11 *Years*).

Rootstock.	Average Height.	Average Spread	Average Girth of Root-stock.	Average Girth of Union.	Average Girth of Tree Stem.	Average Girth of 2nd Union.	Average Girth of Tree Stem above 2nd Union.
	Ft. Ins.	Ft. Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
			Scion Variety.—Bigarreau Napoleon.				
Mazzard	0 4	1 0	$6\frac{1}{2}$	$4^{7}/_{12}$	$7\frac{1}{3}$	(1 tree declining)	
Mahaleb	—	—	$3\frac{3}{4}$	$7\frac{1}{6}$	$7^{11}/_{24}$	(2 trees remain, both dying)	
Kentish	—	—	$3^{11}/_{12}$	$7^{5}/_{6}$	$6\frac{1}{6}$	—	—
Kentish on Mazzard	—	—	$2^{5}/_{6}$	$4\frac{1}{2}$	$8\frac{1}{6}$ K	$10\frac{1}{3}$	$10\frac{1}{6}$
			Early Lyons.				
Mazzard	—	—	$7\frac{1}{3}$	$7\frac{1}{3}$	$9\frac{1}{3}$	—	—
Mahaleb	—	—	$3\frac{1}{6}$	$3^{7}/_{48}$	—	(2 trees remaining)	
Kentish	—	—	5	6	$5\frac{1}{2}$	—	—
Kentish on Mazzard	—	—	$4\frac{1}{3}$	6	$4\frac{1}{4}$ K	$7^{5}/_{6}$	$8^{1}/_{12}$
			Early Purple Guigne.				
Mazzard	-3 4	-1 2	$6\frac{1}{2}$	$9\frac{1}{2}$	$12\frac{1}{2}$	—	—
Mahaleb	—	—	$11^{5}/_{6}$	$5\frac{3}{4}$	$7\frac{2}{3}$	(2 trees dying)	
Kentish	—	—	$7^{1}/_{12}$	$7^{5}/_{6}$	$10\frac{1}{3}$	—	—
Kentish on Mazzard	—	—	$6\frac{1}{6}$	$5\frac{2}{3}$	$5\frac{2}{3}$ K	$9\frac{3}{4}$	$7^{5}/_{6}$
			Florence.				
Mazzard	—	—	$8^{7}/_{12}$	$7\frac{2}{3}$	$10\frac{1}{2}$	—	—
Mahaleb	0 3	0 2	$-4^{5}/_{6}$	$11^{7}/_{12}$	$8^{11}/_{24}$	(1 tree dead)	
Kentish	—	1 0	$9\frac{5}{8}$	$7\frac{1}{4}$	8	(1 tree dead)	
Kentish on Mazzard	1 9	3 3	$15\frac{3}{8}$	$15\frac{1}{4}$	$12\frac{1}{4}$ K	$14\frac{3}{4}$ (1 tree dead)	$14\frac{3}{8}$
			St. Margaret's.				
Mazzard	—	—	$8\frac{1}{2}$	$8\frac{1}{2}$	$9^{7}/_{12}$	—	—
Mahaleb	5 5	-0 4	$8\frac{2}{3}$	$11^{1}/_{12}$	$9\frac{1}{3}$	—	—
Kentish	—	—	—	—	—	(refill trees, too small for recording)	
Kentish on Mazzard	5 6	7 0	$16\frac{1}{2}$	$10\frac{3}{4}$	$10\frac{3}{4}$ K	$14\frac{1}{2}$ (1 tree only of mature age)	15

(K = Kentish stem piece. - minus.)

These figures may be interpreted as showing that between 1923 and 1934 these trees generally ceased to make any noticeable progress in so far as height and spread of branches are concerned. It is true they have been very moderately pruned almost annually over the lateral and terminal growths, mainly to keep them at a workable height and spread—cherry harvesting from large, tall trees proves an expensive item. Wherever increased branch developments are indicated, they have been made by a very few trees, which were younger or more backward at the time the 1923 measurements were taken, and these had since grown to a normal stature, or sufficiently to influence the average of the quota of trees of that particular variety growing on certain stocks. The minus figures in reference to Early Purple Guigne worked on Mazzard rootstock was due to an oversight of the failure of some of the dormant buds to grow on two of the trees, and these trees were shaped and grown for several seasons, until the writer, in passing, saw a few typical Mazzard fruits on some of the limbs. When the close resemblance which the foliage of the Mazzard bears to that of some of the cultivated varieties of sweet cherry is taken into consideration, this error on the part of the Officers in charge of the orchard at the time becomes reasonably excusable. These trees were branch budded, and soon produced fine crowns, practically equal to those on the other trees.

The other instances of increased dimensions are seen in the varieties of trees grown on the Kentish Mazzard combination rootstock, which, as previously indicated, being double worked, were not less than a year

Early Lyons on Mahaleb rootstock. [*E. W. Pritchard, Photo.*]

[*E. W. Pritchard, Photo.*]
Early Purple Guigne on Mahaleb rootstock.

behind the single worked varieties in the time of being started into final growth in the orchard plot. A study of the stems of the trees in the accompanying illustrations reveals in a much more pronounced manner

than these figures can convey, the peculiar nature or configuration of the developments which consistently arise adjacent to the points of union of certain of the rootstocks with all of the scion varieties used in this trial. This is most noticeable in the cases of the Mahaleb and Kentish—the so-called dwarfing stocks.

[*E. W. Pritchard, Photo.*]

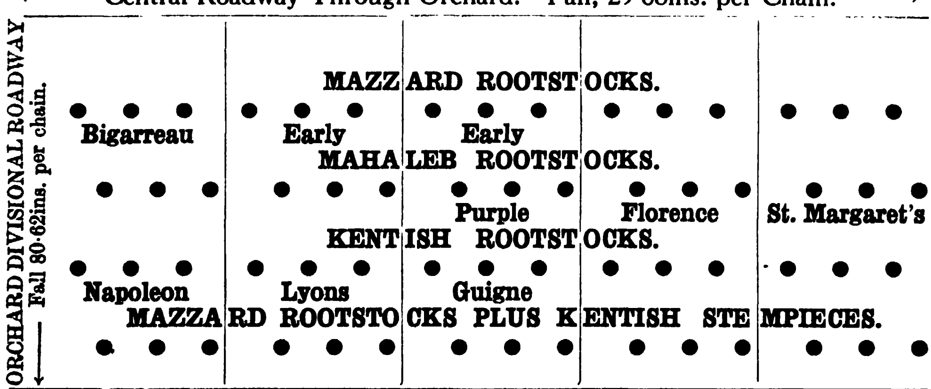
Florence on Mahaleb rootstock.

In the later Table B it will be noted that most of the trees are practically at a standstill as regards branch development, and some have died during the past two or three years. This latter remark particularly applies to those worked on the Mahaleb rootstocks.

SKETCH PLAN OF CHERRY ROOTSTOCK TRIAL PLOT.

SHOWING ARRANGEMENT OF ROOTSTOCKS AND VARIETIES GROWN ON THEM.

←— Central Roadway Through Orchard.—Fall, 29·68ins. per Chain. —→



● Represent Trees.

(*To be continued.*)

(The next article on Cherries will deal with the Root Systems of the Various Rootstocks, and the influence of Rootstocks on Cropping and Quality of Fruit).

A WEEVIL ATTACKING MALLOW (*MALVA PARVIFLORA* L. AND *M. NICAEENSIS* ALL.) IN SOUTH AUSTRALIA.

[By D. C. SWAN, B.Sc., Waite Agricultural Research Institute, University of Adelaide.]

In July, 1933, information was received from Mr. H. J. McConville, of the Metropolitan Abattoirs at Gepp's Cross, that areas of mallow growing in unused stockyards at the Abattoirs had been attacked by an insect to such an extent that the plants had been completely defoliated. The pens were first inspected on the 19th July, 1933. In view of the extensive damage noted and the fact that the family (*Malvaceae*) to which the mallow belongs also contains various cultivated plants, the following notes are given.

Figure 1.—*Malva* plant, showing damage to foliage by *E. sellata*. An undamaged leaf is shown for comparison.

At the time of inspection, in certain pens, pure stands of the weed were completely defoliated; only the standing stems, representing the main axes of the plants remained (Fig. 5). The petioles of the leaves were still attached in many cases, but the leaves were withered from the tips, and the laminae had been eaten away. The stems were also withered at the tips, but remained alive in the lower part. The bark on the upper part of the stems had been removed in many cases, and on the lower parts, where cork-formation had taken place, the damage took the form of irregular scorings. In adjacent mixed associations of *Malva* with other weeds, all stages of injury were noted, isolated plants having leaves with

few holes in them, while in other cases the leaves hung in tatters due to the running together of the rounded feeding holes (Fig. 1). In places where the leaves had been skeletonised extensively, the leaf debris formed a layer beneath the plants. In this material and in the loose soil at the bases of plants not yet defoliated, green grubs of a weevil were sheltering, a dozen or more under each plant. In a few instances, odd larvae were found feeding on sheltered lower leaves in daylight; the normal habit, however, appears to be nocturnal.

Figure 2.—*Ethemaia sellata* **Pasc., larva.**

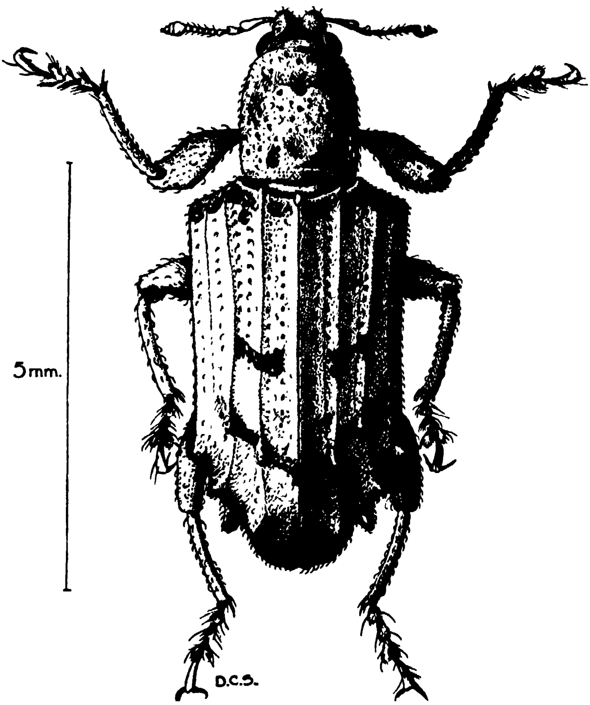


Figure 3.—*Ethemaia sellata* **Pasc. Drawn from a newly emerged specimen, bred in the laboratory.**

In a large patch of the weed which had been defoliated, the soil surface was loose and friable, and digging in the top three inches revealed great numbers of the larvae mostly curled up in cells in the soil prior to pupation. The soil appeared to have been loosened by the larvae in the process of entering it. Approximately one larva per cubic inch could be obtained in such situations. Other weeds in the vicinity showed no signs of attack. Subsequently, this characteristic damage to mallow was noted at a number of localities in South Australia although not to such a marked extent. It is presumed that the insect concerned is widely distributed in the better rainfall areas of the State.

Mature larvae were placed with soil in flower pots, embedded in damp sand, in the laboratory, and by the 14th August, 1933, most of them had pupated. From these, 22 days later, brown-grey weevils developed, which proved to be *Ethemaia sellata* Pascoe (Fam. Curculionidae).*

The habit of feeding on leaves so far from the ground is not usual with weevil larvae. In this instance the larvae were able to climb the plant by means of three pairs of thoracic, and nine pairs of prominent abdominal pro-legs, aided by the terminal region of the abdomen (Fig. 2).

The pupae are translucent green in colour; they move the abdomen actively when disturbed. The adults (Fig. 3) remain quiescent for varying periods up to several days before leaving their earthen pupal cells (Fig. 4).

The affected area of mallows at the Abattoirs was again visited on 22nd September, 1933, and though no adult beetles could be found, a search of the soil revealed many pupae and larvae. Temperatures in the field were lower than those prevailing in the laboratory where the collected larvae were bred out. The main

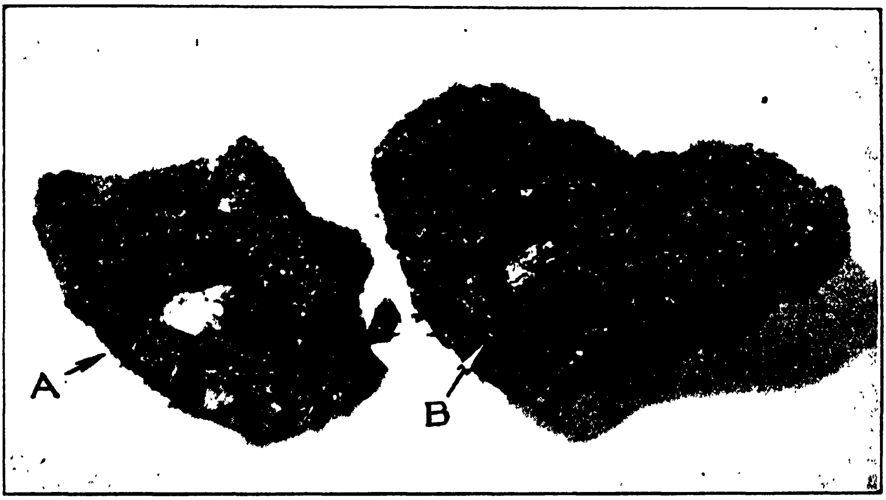


Figure 4.—Pupa (A) and adult (B) of *E. sellata* Pasc. in earthen cells.

point noted was that many mallow plants, apparently almost completely destroyed at the time of the July visit, had now sprouted from dormant buds low down the stem, and a lateral shoot in many cases had become the main axis (Fig. 6). Isolated plants were not so severely attacked as close stands, and this, coupled with the plant's power of regeneration, reduces any significance of the weevil in controlling the abundance of the weed.

Adults of the weevil were commonly met with at another surburban locality (Lockleys) during the winter of 1934. They were found usually on the soil surface beneath mallow plants. In such situations they sham death readily, with legs folded. Two specimens were seen at night (28/9/34) walking on rhubarb leaves, and one was seen feeding on the leaf of a mallow plant. They fell to the ground as soon as disturbed. In the laboratory the adults fed readily on mallow leaves, producing injury similar to that of the larvae. Smooth ovoid eggs, green at first, but later turning black, were laid freely on the leaves and petioles.

Mass injury to *Malva* spp. of the type described in this paper appears to be uncommon; that it may occur sporadically is suggested by one verbal account received. *Ethemaia sellata* appears to be a common feeder on these plants, as its

* Kindly identified by Mr. H. Womersley, Entomologist of the South Australian Museum. The Museum collection contains specimens from all the Australian States. The nomenclature has been confirmed by Sir Guy A. K. Marshall, Director of the Imperial Institute of Entomology, London.

feeding marks are sparingly present on a large proportion of those examined. These plants usually occur as isolated individuals among other weeds, and here the damage is unimportant; only pure stands appear to be liable to severe damage.

Figure 5.—Damage to *Malva* caused by *E. sellata* Pasc. Photo., September, 1933.

Figure 6.—Regrowth of *Malva* damaged by *E. sellata* Pasc. Photo., September, 1933.

Lea (*Journ. Agric. S. Aus.* 1927, xxx., p. 598) noted *E. sellata* as a common weevil, which may attack the bark and buds of fruit trees, shrubs, and vines. The writer has not yet found it to feed on other than malvaceous plants.

STUDIES OF GROWTH AND FRUIT BUD FORMATION No. 5.(1)

OBSERVATIONS DURING TWO SEASONS ON SOUTH AUSTRALIAN APPLES.

[By C. BARNARD, M.Sc., Assistant Botanist, Division of Plant Industry, C.S.I.R., Canberra, and R. FOWLER, Manager Blackwood Experimental Orchard, Department of Agriculture, South Australia.]

[The time of differentiation of the fruit buds of four varieties of apple growing at the Blackwood Experimental Orchard has been determined during two seasons and for one variety during three seasons.

An account of the process of fruit bud formation is given and the development of the fruit buds throughout the season is described.

It has been found that the differentiation of fruit buds occurs slightly earlier during the "on" crop season than during the "off" season and variations in the time of fruit bud formation may also be associated with characteristics of shoot growth. Further, it is shown that under conditions stimulating shoot growth the time of differentiation is delayed, though once differentiation has occurred the rate of development of the fruit buds is accelerated by those conditions which favour vegetative growth.]

A conference of fruitgrowers of the Hills Branches of the South Australian Bureau, held at Balhannah on August 28th, 1930, passed a resolution to the effect "that the Waite Agricultural Research Institute be requested to initiate research into the development of the fruit buds of the apple, with a view to determining as to what period the wood bud changes into the fruit bud." Following a report(2) on the matter by the Chief Horticultural Instructor, the Advisory Board of Agriculture and the Department of Agriculture indorsed the recommendation, whereupon an investigation of the question was commenced by the Waite Agricultural Research Institute. Shortly after the collection of material had started, however, the work was passed over to the C.S.I.R., which was already engaged upon similar studies in other States. The C.S.I.R. therefore made an examination of the material collected during 1930-31 and during 1932-33 and 1933-34 co-operated with the State Department in completing the investigation to date.(3)

1. INVESTIGATIONS DURING 1930-31.

During the 1930-31 season, buds were obtained from two Granny Smith trees growing at the State Experimental Orchard, Blackwood. Both trees were planted in 1910 and at that time consisted of Northern Spy root stocks worked over to Shockley. In the case of one (Tree E.5.5), however, a short intermediate stem of Rome Beauty was grown between the Spy root stock and the Shockley. Both of the mature trees of Shockley were grafted over in 1926 by inserting Granny Smith scions into the main limbs a short distance from the trunk. The heads of the trees during the 1930-31 season, therefore, represented five years' growth of Granny Smith. The trees were both well grown, their trunk circumference at 9in. above soil level measuring 21⅝in. (Tree E.5.5) and 24¼in. (Tree E.3.12) respectively. Up to the time of regrafting to Granny Smith the

(1) Numbers 1-4 of this series appeared in the *Journal of the Department of Agriculture of Victoria*, Vols. XXX., parts 7 and 9 (1932), and Vol. XXXI., part 1 (1933). Article No. 1 of the series dealt with a year's observations of Victorian apples.

(2) *Journal of Agriculture of South Australia*, p. 526, Dec. 1930.

(3) This work has been carried out by the Council for Scientific and Industrial Research and the Department of Agriculture, South Australia, in co-operation. The selection of varieties, the sampling of material, as well as the observations and measurements of tree growth, have been made by the South Australian Department, whilst the C.S.I.R. has carried out the examinations in connection with bud differentiation and development.

trees had borne good average crops biennially of Shockley apples. Since being changed to the Granny Smith variety they have cropped as follows:—

	Tree E.5.5. Lbs.	Tree E.3.12. Lbs.
1928-29	½	7
1929-30	48	159
1930-31	5½	97

No particular manurial treatment has been given to these trees, and during the last three seasons a green manure crop was sown with superphosphate at the rate of 2cwts. per acre. For the first two seasons the very strong growths from the regrafted trees were pruned fairly hard, but subsequently a system of light thinning out of laterals and topping of the leaders was followed.

Collections of buds were made at intervals of one week from the beginning of December, 1930, until the end of February, 1931, and consisted of terminal buds on new spurs produced on two year old wood. The dissection method ([4]) was used in the examination of the buds.

Differentiation of the fruit buds occurred during different periods in the two trees, though insufficient material had been collected to warrant a critical comparison. The buds of Tree E.5.5 commenced to differentiate about the 2nd of January, whilst those of Tree E.3.12 did not commence until the middle of January. It is possible that the difference in the vigour of the two trees (c.f. trunk circumferences and yields) was responsible for the difference in the time at which the fruit buds were differentiated. On the other hand, the difference may be attributed to the difference in the constitution of the two trees. The complexity of the Tree E.3.12 in that it consisted of Granny Smith on Shockley on Rome Beauty on Spy stock rendered it unsuitable for preliminary work.

2. INVESTIGATIONS DURING SEASONS 1932-33 AND 1933-34.

(a) The Trees.

Five trees of each of four varieties, viz., Dunns, Jonathan, Cleopatra, and Granny Smith, were selected at the Blackwood Orchard as fair average representatives of each variety.

The varieties—Dunn's Seedling, Jonathan, and Cleopatra—were planted in 1908 in the barrier rows associated with the Manure Plots. These trees are worked directly on to Northern Spy stocks and are fairly well grown types for the varieties, and have produced good average crops since 1918. They have received regular and moderate pruning and have maintained a fair average annual growth, the mean trunk circumference at 9in. above soil level being respectively 19.3in., 17.3 in., and 17.9in.

No particular manurial treatment has been given to these trees, though, as previously stated, they occupy positions as buffer rows between manured rows of trees, but as the planting is on the septuple system, they do not appear to have derived any benefit from the manures applied to adjacent trees.

The selected Granny Smith trees were planted in 1910, and their constitution is somewhat involved. In each instance the root stock is Northern Spy, but one tree has short intermediate pieces of both Shockley and Paradise, and two others a short intermediate piece of Rome Beauty between the Spy root stock and the Granny Smith. One tree (E.5.5) was used in the 1930-31 season, and the general remarks made on page 1129 in reference to the two Granny Smith apply equally to all. Tree E.2.19 was used for shoot and spur growth measurements, and the constitution of this tree is Granny Smith on Shockley on Paradise on Spy. The average trunk circumference at 9in. above soil level of the five Granny Smith trees is 23.3in.([5])

([4]) Vide *Journal of Agriculture*, Department of Victoria, Vol. XXX., part 7, p. 353 (1932).

([5]) Portion of tree where circumference measurements were made would be Shockley wood.

All the trees are grown under non-irrigated conditions, with an average rainfall of approximately 31in., though the rainfall for the seasons 1932-33 and 1933-34 has been much below the average, with low summer rainfall.

Normal development has not been retarded in any way through serious injury by either insect or fungal pests.

(b) Growth Measurements.

One tree of each variety was selected for detailed observation of growth, and the following records were made each week on each tree:—

(1) The length to the nearest millimetre of each of 10 selected and labelled shoots growing from the terminal bud of pruned leaders.

(2) The number of leaves and the greatest length and width of all leaves (omitting petiole) on each shoot.

(3) The diameter of each of the current season's selected shoots at a point 1in. from the base, and the diameter of the two year old wood at the base of the current season's shoots.

(4) The number and size (length and width) of the leaves on each of 10 selected and labelled spurs of two years or more of age.

In addition the time of blooming, defoliation, and of harvest, as well as relevant climatological data, were recorded.

(c) The Collection of Buds.

The fruit buds have been classified into three types on the basis of their position on the trees, viz., 1, terminal buds of laterals; 2, terminal buds of young spurs on two year old wood; 3, terminal buds on spurs two years of age or older. Only types 2 and 3 were used for the purpose of this investigation.

During 1932-33, samples of 60 buds were collected at weekly intervals from the end of November until the 1st of February, then at intervals of 14 days until the end of March, and thereafter at approximately three weekly intervals until the beginning of September, 1933. Each sample consisted of 30 type 2 and 30 type 3 buds, which were collected and examined separately. In making each collection, three buds of both type 2 and 3 were collected from each of the five trees used in the investigation.

During 1933-34, type 2 buds only were taken from Jonathan and only type 3 were collected from Dunns, Cleopatra, and Granny Smith. Weekly collections in this season were continued until collections ceased on the 26th April. In other respects the procedure was similar to that followed in 1932-33.

(d) The Structure of the Buds.(6)

The early development of the fruit bud is illustrated in the photographs of dissections of buds reproduced in Plate 1.

During late autumn and winter the flower or fruit buds of the apple may be distinguished macroscopically from the leaf buds by reason of the fact that the former are larger and plumper than the latter. The leaf bud consists of a short axis upon which a number of leaf formations are inserted in a close spiral sequence. The outer eight or nine formations are known as bud scales; the outermost being hard and dark brown in colour, whilst the inner ones are lighter in colour and very hairy. The scales serve to protect the rudimentary foliage leaves and growing point of the axis from frost, drying, and injury generally. The innermost bud scales are followed by several "transition" leaves which are also densely hairy. They differ from the true scales in the fact that when the bud opens they develop small green laminae and form true leaves in that the stipules are very large and the laminae comparatively small. Further,

(6) A more detailed account of the structure and development of the apple bud is recorded in the first article of this series, vide *Journal of Agriculture of Victoria*, Vol. XXX., part 7 (1932).

the transition leaves are often shed very early in the season. Inside the covering of scales and transition leaves a number of rudimentary foliage leaves are found. By early November a number of foliage leaf rudiments have been formed, and during the growing season the growth of the leaf bud consists of a slight elongation of the axis concurrent with the splitting off of further leaf rudiments from the growing point.

The fruit bud is known as a "mixed" bud, since it produces not only an inflorescence of flowers, but a cluster of leaves as well. During late autumn dissection of the mixed bud reveals its organisation. Approximately 21 leaf formations are inserted upon the axis which terminates in a flower primordium (young flower bud). These leaf formations are in the form of scales, transition leaves, and true foliage leaves as in the leaf bud, but above the youngest foliage leaf four bracts are produced upon the axis. A flower primordium is developed in the axils of three bracts and in the axils of the two uppermost (youngest) foliage leaves, so that each bud contains a cluster or infloresence of five or six flower buds. A small vegetative bud is produced in the axils of the second and third foliage leaves After flowering, these buds develop and result in the dichotomous branching of the spur. Usually nothing is produced in the axil of the lowest or first foliage leaf.

Early in the season and until differentiation occurs, the growth of the mixed bud consists of the splitting off of leaf formations from the growing point and no difference can be seen between the potential leaf bud and the potential fruit bud (Stage 1, Plate 2). The growing point is small and inconspicuous. The first indication that a bud is to become a fruit bud is revealed in an enlargement of the growing point and crown of the axis. From the enlarged apex the bracts are split off as shown in Figs. 1 and 2, Plate 1, and Stage 2, Plate 2. In Plate 1 the illustrations are photographs of dissections of buds looking down upon the growing points, whilst in Plate 2 sections through the centre of the buds are represented. The outer scales have been removed from the buds shown in Plate 1 and four of the foliage leaves broken off at the base. The youngest foliage leaf (L5) and two bracts (b_1 b) are seen beside the growing point (VP).

The growing point continues to enlarge whilst two further bracts are formed and the primordia of the axillary flowers appear in the axils of the upper foliage leaves (L4 and L5). The apex of the growing point then flattens preparatory to the formation of the terminal flower. In Fig. 3, Plate 1, a dissection of a fruit bud at this stage is depicted. The sepals of the terminal flower are forming at K; the axillary flower primordia (p) can be distinguished in the axils of three bracts (b_1, b_2, b_3) and also at FP in the axils of the two youngest foliage leaves L4 and L5. As each flower primordium enlarges it splits off two bractlets which can be seen at "S" in the case of the two large flower primordia (FP). The formation of the sepals of the terminal flower then takes place (K in Fig. 4, Plate 1, and Stage 4, Plate 2). Subsequent development consists of the growth of the flower primordia, and the parts of the flower arise in the order, petals, stamens, and carpels (pistils). In Plate 2 a series of photographs shows the development of the terminal flower of the cluster, and a date for each stage represented is given. As the same stage of development is reached at different times by different varieties, as well as by the one variety in different seasons, the dates shown on the plate only apply to the variety and season represented.

Some time before growth ceases in autumn all the parts of the flower have been formed, and as the buds enter the winter resting period they have reached the condition shown in Stage 8. The stamens are differentiated into anther and filament, though there is no indication of pollen or ovule formation until growth recommences in the following spring.

(e) Time of Differentiation.

The first morphological indication of the differentiation of the fruit bud is observed in the elevation and broadening of the crown of the bud axis as

described above. This does not occur in all buds simultaneously, but takes place during a certain period which varies somewhat in length. In Table I. the period during which buds were differentiating is shown in column 4, whilst in column 5 the time at which the majority of buds were differentiating is indicated. The date given under this heading has been determined with as much accuracy as possible and provides a trustworthy means for comparing the time of differentiation in different seasons and in different varieties.

TABLE 1.—*Time of Differentiation.*

Variety.	Season.	Bud Type.	Period of Differentiation.	Majority of Buds Differentiating.
Dunns	1932-33	2	14/12/32-28/12/32	21/12/32
		3	21/12/32-28/12/32	24/12/32
	1933-34	—	No Fruit Buds.	—
Jonathan	1932-33	2	14/12/32-11/1/33	21/12/32
		3	21/12/32-28/12/32	24/12/32
	1933-34	2	13/12/33-27/12/33	20/12/33
Cleopatra	1932-33	2	21/12/32-11/1/33	24/12/32
		3	21/12/32-11/1/33	24/12/32
	1933-34	3	6/12/33-20/12/33	13/12/33
Granny Smith	1932-33	2	28/12/32-11/1/33	4/1/33
		3	28/12/32-11/1/33	4/1/33
	1933-34	3	27/12/33-4/1/34	31/12/33 to 1/1/34 approx.

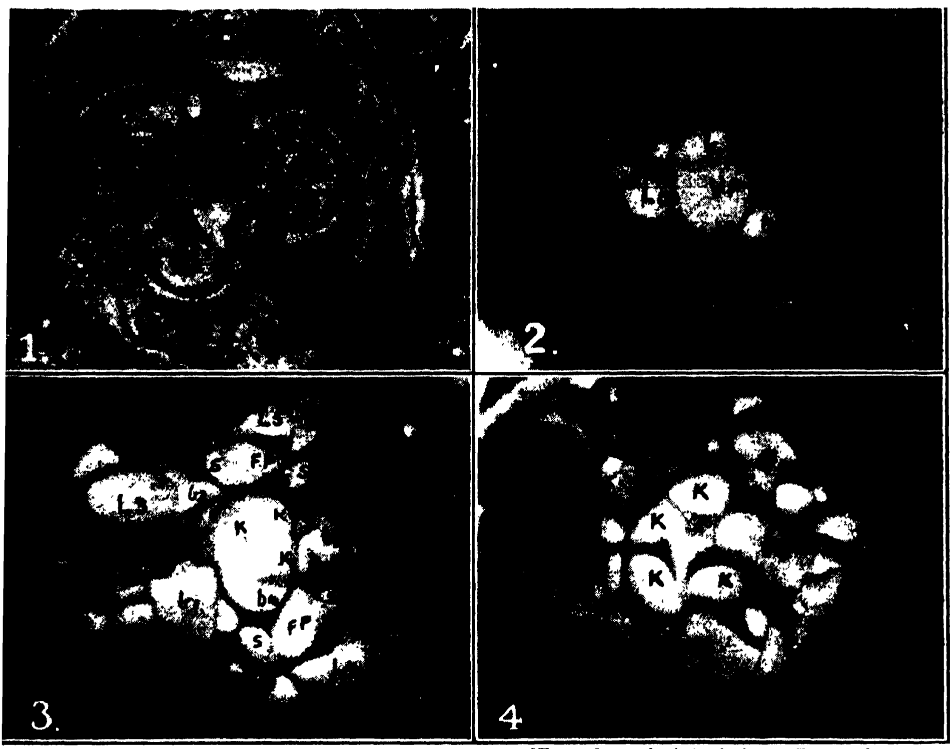
During 1932-33 the buds of Dunns, Jonathan, and Cleopatra differentiated at the same time, *i.e.*, during the third week in December, whilst those of Granny Smith were about 11 days later. Both types of buds were examined in each variety in 1933-34, and it is to be noted that buds from spurs on two year old wood differentiated several days earlier than those of older spurs in Jonathan and Dunns, whilst no difference is apparent in the case of Cleopatra and Granny Smith.

During 1933-34 insufficient fruit buds were formed in Dunns to permit of the determination of the time of differentiation. In Jonathan differentiation occurred during practically the same period as in the previous season. In Granny Smith the majority of buds differentiated four to five days earlier in 1933-34, whilst in Cleopatra the fruit buds formed about 11 days earlier in 1933-34 than in the previous season. In the following section a description of the vegetative growth of the trees during the two seasons is given. This will enable us to compare these factors with the variations noted above in the time of fruit bud formation.

(f) Growth.

A comparison of the vegetative growth in each variety during the two seasons is made in Table 2, in which the main growth characteristics for each season are summarised. In all varieties a very light "off" year crop was borne in 1932-33, whilst a heavy "on" crop was matured in 1933-34. The growth of the

leading shoots ceased earlier in 1933-34 and less elongation growth was made. The internodes of the leading shoots were also shorter in 1933-34 and less leaves were produced per shoot than in the previous season. Cessation of leaf growth in the spurs possibly occurred about the same time in both seasons. Unfortunately measurements were not commenced sufficiently early during the first season to permit a more critical comparison. In both seasons elongation growth ceased first in Dunns and Jonathan, followed by Cleopatra, whilst the shoots of Granny Smith continued growth latest in the season. The cessation of growth in spur leaves also occurred slightly earlier in Dunns and Jonathan than in Cleopatra and Granny Smith. In both seasons defoliation occurred in the sequence, Dunns, Jonathan, Cleopatra, and Granny Smith, and was earlier in 1932-33 than in 1933-34 by about a month in Dunns, three weeks in Jonathan, and a fortnight in Cleopatra, whilst in Granny Smith defoliation occurred during the same period in both seasons. It would appear, therefore, that in the "on" season less vegetative

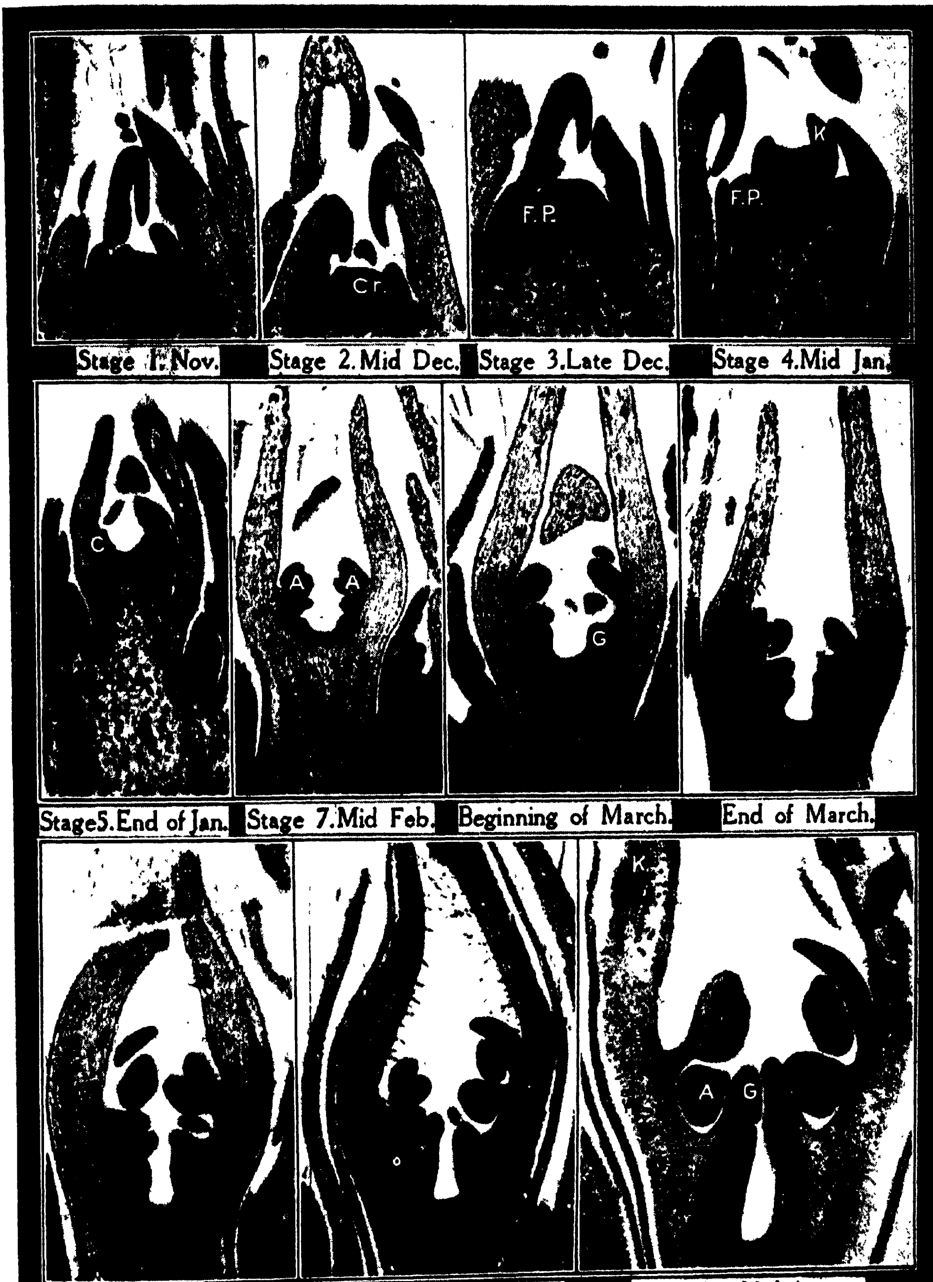


[From *Journal of Agriculture, Victoria.*]

Plate 1.—Blossom bud development in the Cleopatra Apple, Harcourt, Victoria (magn. X 72). For explanation see text.

Key:—FP, Flower primordia; S, Bractlets; Cr, Crown; VP, Growing point; b, Bracts; Tr. L, Transition leaves; L, Leaves; K, Sepals (calyx); C, Petals (corolla); A, Stamens (androecium), and G, Carpel (gynaecium).

growth is made than in the "off" season, and this is possibly due to the fact that growth ceases earlier during the season in which the tree is carrying a heavy crop. In this connection it is of interest to compare the different amounts of growth made in the two seasons of each variety (Table 3). It will be seen that the difference in the amount of growth produced in two seasons is greater in those varieties which continue growth late in the season, though the difference in the time of defoliation is least. The ratios of the average length of internode in 1933-34 to the average length in 1932-33 were 1.52 in Granny Smith, 1.24 in Cleopatra, 1.05 in Jonathan, and 1.05 in Dunns. If the internodes had elongated to the same extent in 1933-34 as in 1932-33, the average



[From *Journal of Agriculture, Victoria.*]

Plate 2.—Blossom bud development in the Cleopatra Apple, Harcourt, Victoria (magn. X 50). For key see plate 1.

TABLE 2.—*Summary of Growth Characteristics during the Two Seasons.*

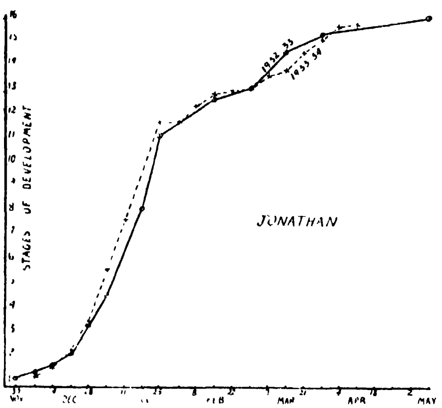
1 Variety.	2 Season.	3 Mean Date of Cessation of Elongation Growth of Leading Shoots.	4 Mean Length of Leading Shoots.	5 Mean No. of Leaves Per Leading Shoot.	6 Mean Length of Internodes of Leading Shoots.	7 Date of Cessation of Growth in Spur Leaves.	8 Mean No. of Leaves Per Spur.	9 Date of Defoliation Shoots.	10 Crop Average Per Tree.	11 Date of Harvest.
Dunns	1932-33	4/1/33	cm. 42	26·0	cm. 1·61	Prior to 25/11/32	9·8	* 12/4/33 24/4/33 12/5/33	Off year, 9½lbs.	20/3/33
	1933-34	25/12/33	34·8	22·9	1·52	22/11/33	5·9	14/5/34 26/5/34 23/6/34	On year, 320½lbs.	21/3/33 5/4/33
Jonathan	1932-33	2/1/33	51·6	22·6	2·28	Prior to 25/11/32	7·3	24/4/33 14/4/33 12/6/33	Off year, 76½lbs.	28/2/33 9/3/33
	1933-34	27/12/33	42·5	20·5	2·07	16/11/33	7·5	16/5/34 28/5/34 23/6/34	On year, 200lbs.	2/3/34 14/3/34
Cleopatra	1932-33	16/1/33	56·1	25·2	2·22	End of November.	8·1	15/5/33 31/5/33 20/6/33	Off year, 123lbs.	8/3/33
	1933-34	3/1/34	45·8	25·5	1·79	23/11/33	8·0	28/5/34 16/6/34 29/6/34	On year, 302lbs.	17/3/33 5/4/33
Granny Smith .	1932-33	24/1/33	57·8	31·5	1·83	End of November.	11·0	14/5/33 29/5/33 30/6/33	Off year, 84lbs.	5/4/33
	1933-34	9/1/34	35·2	25·9	1·20	26/11/33	8·4	16/5/34 28/5/34 26/6/34	On year, 321lbs.	27/3/34 13/4/34

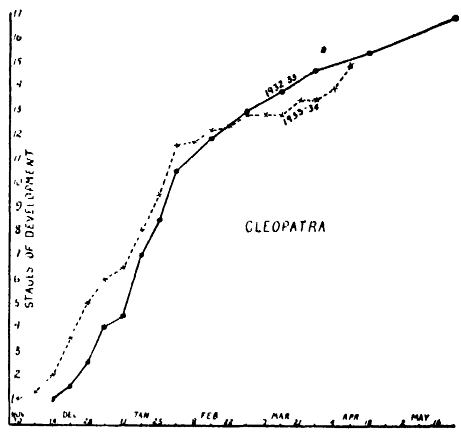
* In column 9 the three dates given indicate defoliation commenced, 50 per cent. and completed respectively.

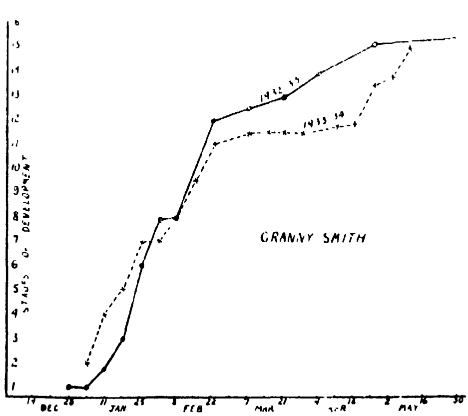
TABLE 3.

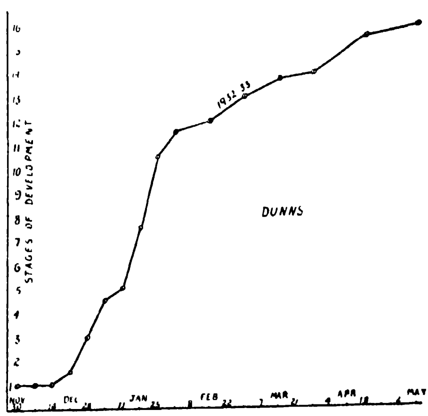
Variety.	Average Length of Shoot, 1932-33.	Average Length of Shoot, 1933-34.	Diff.	Diff. as Per Cent. of Length in 1933-34.
	cms.	cms.	cms.	%
Granny Smith	57·8	35·2	22·6	39
Cleopatra	56·1	45·8	10·3	18·3
Jonathan	51·6	42·5	9·1	17·6
Dunns	42·0	34·8	7·2	17·1

shoot length would have been increased by 2.07 cms. in Dunns, 4.30 cms. in Jonathan, 10.7 cms. in Cleopatra, and 16.32 cms. in Granny Smith. In other words, the difference in the length of shoot produced in the two seasons (1932-33 and 1933-34) was due entirely to a difference in the length of internodes in Cleopatra; 72 per cent. of the difference was due to this factor in Jonathan, 47 per cent. in Granny Smith, and 29 per cent. in Dunns.









A comparison of the climatological conditions during the two seasons fails to account for the differences which have been observed in the growth behaviour of the trees. It appears extremely probable that they are most closely related to the differences in amount of crops produced during the two seasons. In the "on" year elongation growth of shoots ceases earlier, the differentiation of the

buds occurs earlier, the internodes of the shoots are shorter and less leaves are produced per shoot, and defoliation occurs later than in the "off" season. The difference in the amount of growth produced and length of growing period is most marked in those varieties (Jonathan and Dunns) which have a short growing period.

(g) Development of the Buds Subseqent to Differentiation.

The development of the buds of the four varieties during the two seasons is graphically represented in the charts (Fig. 1). The developing buds have been divided into a number of stages (1-18), based upon the growth of the parts of the embryo flowers, and the stage reached by the majority of buds in each variety has been plotted at intervals of one week to a fortnight throughout the season. It may be observed that the buds of Jonathan developed at very much the same rate in each season. During 1933-34 development was slightly in advance of that of 1932-33 until about the third week in January; subsequently development was parallel in both seasons. In Cleopatra the fruit buds were more advanced in 1933-34 during the early stages of growth; about the end of January, however, the rate of development slackened, and during the period February and March was not so rapid as in the previous season. In Granny Smith development again was at first most advanced in 1933-34. From the end of January until the beginning of March the growth of the embryo flowers was considerably behind that of the previous season. Rapid development occurred again, however, during April, with the result that by the middle of May the fruit buds were just as far advanced in this season as in 1932-33. It seems very probable that these differences in the rate of development of the fruit buds are to be attributed to the differences in the time of maturation of the crops of the three varieties. In Jonathan the early maturation of the crops resulted in parallel development from the end of January during both seasons. The latter maturation of the heavy crops in the case of Granny Smith meant that the development of the fruit buds was retarded during the period of maturation and did not pick up until competition from this source ceased in early April. The effect of the developing crops on the growth of the fruit buds in Cleopatra might be expected to be less pronounced than in the case of Granny Smith. In addition to the time of maturation it is to be noted (Table 1) that crops produced during 1933-34 were heaviest in Granny Smith and lightest in Jonathan.

3. CONCLUSIONS.

Vegetative growth is less vigorous during the "on" season than during the "off" season. The carrying of heavy crops, irrespective of seasonal conditions, tends to cause the earlier cessation of shoot growth, the production of shorter shoots with shorter internodes, and less leaves and later defoliation. This less vigorous shoot growth is accompanied by a slightly earlier differentiation of the fruit buds. Studies elsewhere (*i.e.*, Abbott in Tung Oil Tree, *U.S.D.A. Jour. Agr.*, Res. 31, 1925, pp. 679-694) show that differentiation occurs later in the season in trees of the one variety which are most vigorous and vegetative. In these studies it was noted also that the more vigorous of the two Granny Smith trees examined in 1930-31 differentiated its buds later than the other slightly less vigorous trees. Irrigation (Wiggans, *U.S.D.A. Journ. Agr. Res.* 31, 1925, pp. 865-882) has also been reported as delaying the period of differentiation in the apricot and pear in California. This effect is associated no doubt with a prolongation of the growing period.

When differentiation has occurred, however, it would appear that conditions which favour vegetative or shoot growth also accelerate the development of the fruit buds. In the same way seasonal conditions, drought, &c., which retard shoot growth, have a similar effect upon the growth of the fruit buds. Studies in other localities show this point very clearly. In the present experiment the retarding influence of a heavy crop upon the development of the fruit buds is illustrated in a comparison of the three varieties—Jonathan, Cleopatra, and Granny Smith.

EXPLANATION OF TEXT, FIG. 1.

The developing buds have been divided into a number of arbitrary stages, and the stage reached by the majority of the buds in each collection is plotted against the date of collection. Stage 7 corresponds to the origin of the sepals and Stages 11, 12-13, and 14 to the origin of the petals, stamens, and pistils respectively.

SAND COLIC IN HORSES.

Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S. (Deputy Chief Inspector of Stock), in the course of a reply to the Secretary of the Bugle Branch of the Agricultural Bureau as to the treatment of sand colic in horses, says there are many ways in which the horses can be prevented from these dangers, *e.g.*, always feeding from nosebags, or if using feed mangers or boxes, either carefully sweeping up any spilt feed or making the floors of stable of stable of some hard material. Hay could be fed from nets or hayracks.

In the case of grazing on growing grass or cultivated crops, no horses should be turned into it until the grass is at least 6in. high or the crown of such plants as dandelions is well developed and well above the surface level of the soil.

It would probably pay better to roll the stubble, gather and stack it, and feed it to the horses rather than allow them to graze on it as they go for the "flag" at the bottom of the straw and in so doing gather a lot of sand.

If, however, some of these recommendations cannot be put into practice some good would be gained by periodically giving the animals a purgative dose of raw linseed oil (1 to 2 pints per horse).

Curative Treatment.—Affected animals as soon as noticed to be showing colicky pains should be given the following drench:—Raw linseed oil, 1½-2 pints; oil of turpentine, 4 tablespoonsful. Then give enemas of soapy water every three hours. Twice a day place on the tongue 1 teaspoonful of powdered nux vomica mixed with a little honey, treacle, or jam, and do so for at least 10 days. If the horse is still colicky 24 hours later, or lying about and not eating, repeat the oil drench and enemas of soapy water. Pollard gruels should be given as a drench two or three times a day, giving 2 pints at a time.

In obstinate cases it may be necessary to throw the horses, place them on their backs in a trench, and massage and knead the abdomen with the object of dislodging the sand from its lodgment in the bowels.

Feeding Molasses with Cocky Chaff and a Little Bran.—This is a very poor ration, but if given, molasses should be used at the rate of 2·4 pints per day mixed with water and mixed with the cocky chaff and bran. If horses are exposed to the danger of taking sand in with their feed, and no steps are taken to prevent them doing so, their owners will always have cases occurring, and unless these cases are seen to early and treatment is given before the sand has had time to accumulate, many horses will be lost. Horses become sanded if (*a*) allowed to graze on paddocks where grass is just coming through the ground or feeding on stubble grown on sandy soil; (*b*) hay is thrown down on the ground; (*c*) chaff is spilt out of mangers on to the ground and horses later attempt to pick it up.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF MID-NORTH BRANCHES.

Branches of the Agricultural Bureau in the Middle North districts of the State, met in Conference at Red Hill on March 14th when there was an excellent attendance of delegates from Snowtown, Beetaloo Valley, Jamestown, Koolunga, Blyth, Gulnare, Narridy and Riverton.

Mr. H. J. Crouch (President of the local Branch) occupied the Chair.

The Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), Hon. A. L. McEwin, M.L.C. (Member Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture, Messrs. H. B. Barlow, H.D.D. (Chief Dairy Instructor), R. C. Scott, R.D.A. (Supervisor Experimental Work), E. L. Orchard, R.D.A., W. C. Johnston, R.D.A., J. O. Hatter, H.D.D. (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary, Agricultural Bureau) attended on behalf of the Department of Agriculture.

The Minister delivered the opening address, and the following papers were read and aroused instructive discussions:—"How to Make Sheep Farming Profitable," J. H. Crouch (Red Hill); "Mixed Farming," P. Curtin (Beetaloo Valley); "Veterinary Lodges," R. J. Rose (Laura); "Pigs on a Mid-North Farm," T. Welbourn (Narridy); and "Wheat Varieties for the Koolunga District," S. J. Pedler (Koolunga). Conference carried the following resolutions:—"That the 1936 Conference be held at Beetaloo Valley." "That in the opinion of this Conference it is desirable that action be taken to secure, by means of the formation of a Veterinary Lodge, or other means, the services of a veterinary surgeon for the district included in the Mid-Northern Agricultural Bureau Conference Area."

Officers of the Department replied to numerous questions and the evening session was occupied by an illustrated address, "Fat Lambs and Sheep," by Mr. R. C. Scott.

LOWER NORTH BUREAU CONFERENCE.

Delegates from Saddleworth, Riverton, Roseworthy, Farrell's Flat, Balaklava, Watervale, Penwortham, Alma, Owen, Wasleys, and Blyth Branches of the Agricultural Bureau met in Conference at Blyth on March 28th. Hon. A. L. McEwin, M.L.C. (Member of the Advisory Board of Agriculture) presided, the Department of Agriculture being represented by Mr. F. Coleman (Member Advisory Board), Professor A. J. Perkins (Director of Agriculture), Messrs. H. B. Barlow, H.D.D. (Chief Dairy Instructor), R. C. Scott, R.D.A. (Supervisor Experimental Work), W. C. Johnston, R.D.A., J. O. Hatter, H.D.D., J. B. Harris (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary). The following papers were read and discussed:—"Management of the Farm Team," Mr. R. H. Eime (Blyth); "Mixed Farming," Mr. H. Bradley (Owen); "Marketing Farm Products," Mr. E. H. Lanyon (Blyth); "The State's Problem of Low Quality Wheats," Mr. W. J. Marshman (Owen); and "The Fall in Wheat," Mr. R. Robins (Saddleworth). The Agenda contained a wide range of Agricultural questions, which were replied to by Departmental officers, and the following resolution was carried:—"That the 1936 Conference be held at Owen." Professor Perkins presented the trophies to the successful competitors in the Midlands District Crop Competition.

The evening session took the form of a social, when the visitors were entertained by members of the Blyth Branch. Mr. R. H. Eime capably carried out the secretarial duties of the Conference.

SOUTH-EASTERN (UPPER) CONFERENCE.

South-Eastern Branches of the Agricultural Bureau held their Annual Conference at Mundalla on March 20th. This was the first occasion the Mundalla Branch undertook the responsibility of a Conference, and those who attended it were highly pleased with the arrangements, which were controlled by the Secretary (Mr. A. Ross). There was a display of produce of the district, including grain, fruit, vegetables, grasses, and other fodders, and Mr. Ross exhibited a special display of veterinary instruments, medicines, and specimens illustrating various ailments common to farm stock. Some time back the Mundalla Branch established a veterinary chest containing medicines and instruments, which are in demand by owners of stock. Mr. Ross personally superintends the use of the chest, and the advice and assistance he gives to his fellow-members are greatly appreciated throughout the district.

Mr. J. T. Ryan presided at the morning session, and besides members of neighbouring Branches there were present Messrs. S. Shepherd (Advisory Board of Agriculture), Professor Perkins (Director of Agriculture), Professor Prescott (Waite Agricultural Research Institute), H. B. Barlow (Chief Dairy Instructor), R. C. Scott (Supervisor of Experimental Work), L. J. Cook (Manager Kybybolite Experimental Farm), E. S. Alcock, W. H. Downes, and A. L. Warren (District Instructors), C. A. Goddard (Assistant Wool Instructor, School of Mines), and H. C. Pritchard (General Secretary).

In his opening address Mr. Shepherd made a short reference to his visit abroad. He was informed in England that there would always be a demand for Australian wheat on account of its colour and quality. It was necessary, therefore, that all concerned should do something towards improving the existing baking quality of our wheats. The production of wool was small in Germany, but that country was making such strides in the manufacture of artificial wool that she was endeavouring to become self-supporting in this respect. Woolgrowers were paid 30 per cent. above world market rates, and it was a condition of clothing contracts that clothing must contain 70 per cent. of wool grown in Germany. Australia was shipping inferior quality butter which was being blended with the product of foreign countries. A valuable lesson could be learnt from Denmark, which follows up her sales in order to see that their customers actually receive the product of that country. If the exports from Australia were more rigidly controlled in regard to quality we would have a better name on the English market than we had to-day. In connection with experimental work, he considered that the system adopted at the Kybybolite Experimental Farm was the most practical he had seen. The plots were a reasonable size (from 3 to 5 acres), and gave a fair indication of what could be produced in the district. A striking feature of stock management in England was the system of confining districts to certain breeds. Thus in one district Guernsey cattle would be found on all farms and no other breeds were kept. The same principle applied to sheep, and he thought that such a system could be adopted in South Australia with advantage to the State. He kept Jersey cattle on his farm at Kybybolite, but he would be willing to change to some other herd provided that it was suitable to the district and that all other farmers did the same.

The following papers were read and discussed:—"Side Lights and Side Issues of Pig Farming," by Mr. J. T. Ryan (Mundalla); "Some Digestive Diseases of Farm Animals," by Mr. A. Ross (Mundalla); "Seeding," by Mr. G. D. Butler (Wolseley); and "Topdressing of Pasture Lands," by Mr. R. A. Dinning (Mundalla). Numerous questions were answered by Departmental Officers and members of Branches.

Resolutions were carried as follows:—"That a veterinary surgeon be attached to the staff of the Department of Agriculture to lecture to Branches and attend Conferences, &c."; "That the next Conference be held at Bordertown."

Members of the Mundalla Women's Branch held a special meeting during the afternoon, when Mrs. W. Golding presided, and 17 ladies were present.

Mrs. W. Jones read a paper on "Breadmaking." Mr. Pritchard spoke on the various means to secure the best results from meetings, and Mr. A. L. Warren (District Horticultural Instructor) gave an address on "Fruit Preserving and Drying."

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 12.—THE MILK, OR VARIEGATED THISTLE.

Silybum Marianum, Gaertn.

The Variegated Thistle is a native of Southern Europe and the Mediterranean region, and is of common occurrence as a weed throughout the settled parts of the State. It has proved troublesome in parts of the South-East and has been proclaimed noxious for the district of Mount Gambier. A conspicuous feature of this thistle is the curiously mottled or variegated appearance of the leaves, due to the presence of an irregular network of whitish veins on the upper surface, an appearance such as might be caused if milk were to be poured on normally green leaves. In mediaeval times this was accounted for as being of miraculous origin, the legendary explanation being that the Virgin Mary poured drops of milk on the foliage, and that the milky appearance became, henceforth, a permanent feature of this plant, which came to be known by the names "Milk Thistle," "Holy Thistle," and, sometimes, "Lady's Thistle." This legend may, perhaps, explain the miraculous powers attributed to thistles during the middle ages. In many parts of Europe thistles were used by peasants to combat the machinations of witches. The true thistles are spiny plants; but, as was explained when describing the Star Thistle (this *Journal,* February, 1934), the name "thistle" is also applied to a few non-spinous plants closely related to the true thistles, notably to the "Sow Thistle" (*Sonchus oleraceus,* L.). Unfortunately the "Sow Thistle" has a copious milky sap, on which account it is sometimes called "Milk Thistle," and so confused with *Silybum Marianum.* Owing to this confusion the name "Variegated Thistle," which is also in common use, is to be preferred to "Milk Thistle" for the plant under discussion.

Silybum Marianum is one of the largest of the true thistles, the individual specimens varying from less than 2ft. to more than 8ft. in height. Of those naturalised in this country it is exceeded only by the Wild Artichoke (*Cynara Cardunculus,* L.) in size of the leaves and massiveness of the flower-heads. The plants are sometimes annual, but more usually biennial, and they show a preference for moist situations. The stem is at first short and bears a number of broad-lanceolate crowded leaves which may be a foot or more in length and are more or less deeply cut in an irregularly pinnatifid manner. The margins of the leaf-lobes are furnished with rigid spines, so that it is difficult to handle the leaves without injury. The colour of the leaves varies, according to their age and thickness, from pale-green to a dark, almost bottle-green, against which the white network of veins stands out in bold relief. The plants at this stage have a curious "sprawling" habit. Later the stem begins to grow, forming, perhaps, one or two branches, and, towards the time of flowering, it shoots upwards rapidly, the stem-leaves becoming progressively shorter and separated by long internodes. The stem is terminated by a large pink or purplish flower-head, the massive appearance of which is greatly enhanced by the very numerous and large reflexed bracts of the surrounding involucre, as well as by contrast with the relatively slender terminal part of the stem.. The uppermost stem-leaves are very small and appressed, and clasp the stem by rounded prickly auricles.

Botanical Name and Classification.—The name *Silybum* is from the Greek *sillubos,* meaning "a thistle-like plant." *Marianum* means "pertaining to the Virgin Mary," and is on account of the supposed miraculous origin of the white

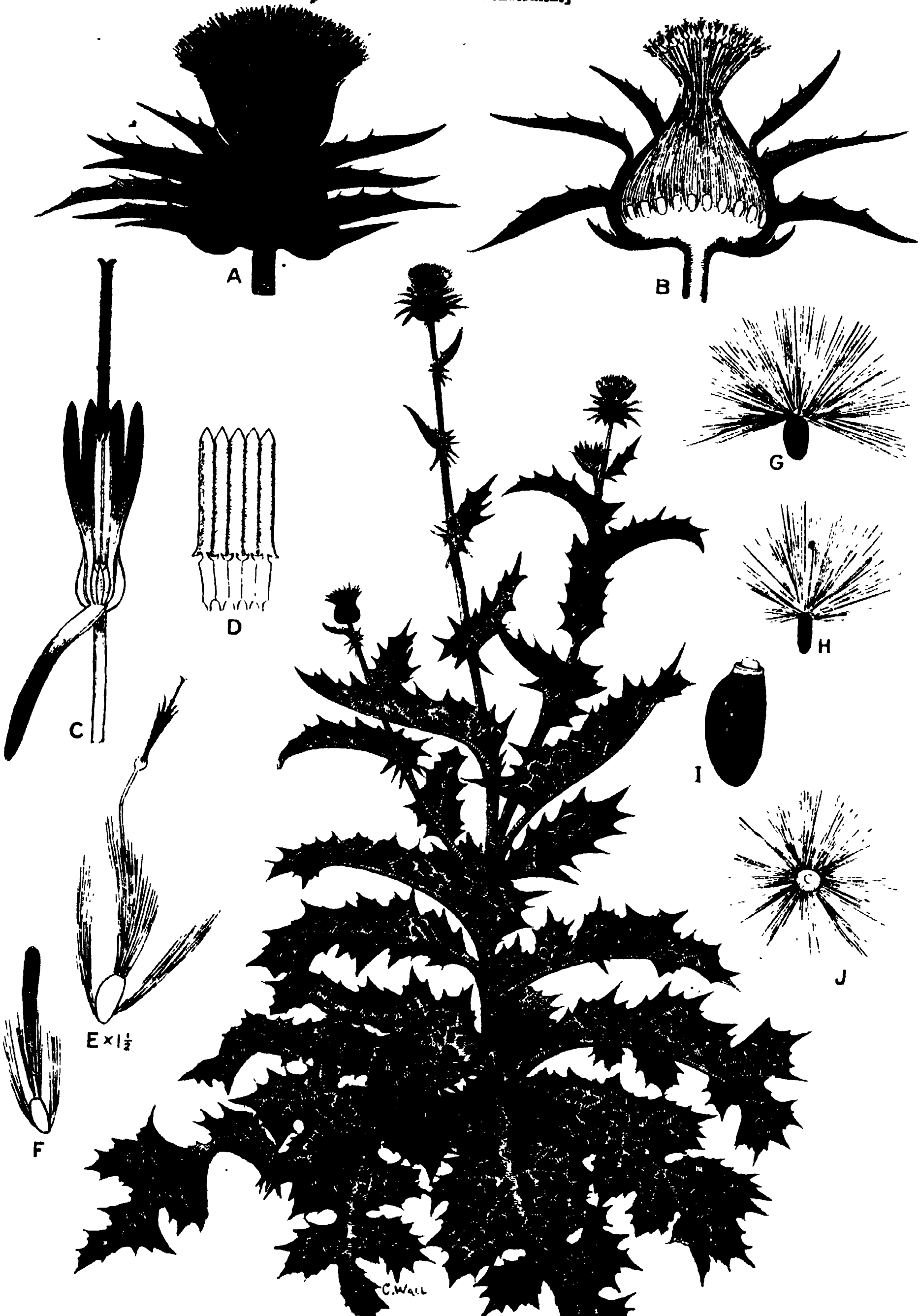
mottling of the leaves. In common with other true thistles this plant belong to the tribe *Cynareae* of the large family *Compositae*. The botanical characters of both the tribe and the family have already been dealt with in these articles (see this *Journal*, Vol. XXXVII., No. 7, p. 856, February, 1934). The genus *Silybum* is included by some authors within the larger genus *Carduus*, from which, however, it differs in having the filaments of the stamens united into a tube instead of their being free. Otherwise the two genera are the same and are distinguished from other members of the tribe by the mode of attachment of the fruitlets (achenes) to the receptacle or swollen axis of the flower-head, by the presence of hairs between the florets and borne by the receptacle, and by the pappus of simple bristles united by their bases into a ring which fits into the tip of the achene and falls away entire at maturity. There are two species of *Silybum*, namely, *S. Marianum*, and *S. eburneum*, Coss. et Dur. Both have purple flowers, but the latter differs from the former species in having the lower leaves with rough instead of smooth surfaces, stronger spines, and with a narrow terminal lobe much longer than the others; also, the intermediate bracts, only, of the involucre are prolonged into spines.

Botanical Description.—An erect glabrous herb, biennial or sometimes annual; stem not much branched, from 18in. to more than 8ft. tall; leaves smooth and shining above and variegated by white veins, the lower ones deeply and irregularly pinnatifid with broad very prickly lobes, the upper ones clasping the stem by rounded prickly auricles. Flower-heads large, solitary at the ends of the branches, with purple florets; outer involucral bracts broad rigid with a rounded spinulose-ciliate appendage ending in a long spine; receptacle hairy; florets all tubular, purple; achenes black, glabrous, shining; pappus of numerous simple bristles united to form a ring at the base. Period of flowering—June-February.

Properties.—The Variegated Thistle is objectionable chiefly on account of its prickly nature. It seeds rather freely, and the seeds germinate very readily after rain to produce large numbers of seedling plants. The first two leaves produced (cotyledons) are entire and ovate-oblong in shape, and they do not show the variegation characteristic of the subsequently formed leaves. Such seedlings spring up in large numbers on and around the sites previously occupied by older plants, and, as they enlarge, become crowded together to form dense clumps and patches which greatly impede the progress of animals, including man. When the plants are full grown, such areas are almost impenetrable, or at least it is practically impossible to pass through them without injury to skin or clothing. The plants prefer moist situations and, despite their spiny character, contain a high percentage of water and are of soft, herbaceous consistency. For this reason the thistles are easy to cut down with a scythe. These thistles are good ensilage plants, and, when wilted, are said to be of moderate value as fodder. The use of the fresh plant, however, as stock feed is attended with a certain amount of risk, as the plants are known to be poisonous at certain times, due to the development of cyanogenetic glucosides, comparable with those sometimes responsible for poisoning by Sorghum and Sudan Grass. On this account it is not advisable to feed the freshly cut plant to stock. But when fully wilted, or as ensilage, it should be safe enough. The seed is said to be good feed for poultry.

Control.—Seed formation should be prevented whenever possible, and, to this end, single plants should be hoed out before the flower-heads develop. Large clumps should be cut down with the scythe, followed by the hoe as soon as the cut parts are wilted sufficiently to allow of access to all parts of the clump. Where a large patch is in full flower the plants should be cut down and allowed to dry *in situ*, the whole patch being fired as soon as the plants are sufficiently dry. The dried flower-heads should be disturbed as little as possible, otherwise the seed will be scattered far and wide. By burning off, a good deal of the seed will be destroyed, but much will remain, and the hoe will require to be used persistently on plants that subsequently appear.

Photograph of a clump of Variegated Thistles. See coloured plate opposite.



VARIEGATED OR MILK THISTLE (*Silybum Marianum, Gaertn.*)

A.—Flower head showing bracts of involucre and florets. B.—The same in section.

C.—Upper part of floret (enlarged) with one petal removed to show the tube of stamens surrounding the style.

D.—Staminal tube opened out. E.—Mature floret. F.—Immature floret.

G.—Fruit (achene) with pappus attached. H.—The same viewed from the side.

I.—Achene with pappus removed.

J.—Pappus viewed from below showing mode of attachment to the achene.

POTATO COMPETITION—MOUNT COMPASS SCHOOL BOYS.

[H. H. Orchard, R.D.A., Horticultural Instructor.]

Four years ago the Mount Compass Branch of the Agricultural Bureau initiated a Potato Competition for school boys attending the local school. Under the rules of this Competition each boy is given 1lb. of selected Carmen seed potatoes, and in the presence of stewards appointed by the Branch from amongst members, must cut and plant his pound of seed. The digging of the crop and weighing of the tubers are also done under supervision, so that the two operations of planting and digging are strictly controlled. No restrictions are placed on the number of sets, planting distances, fertilizers, or treatment of the land before and after planting. The prize goes to the boy who obtains the highest yield. Mr. J. Johnson, of Adelaide, has kindly presented the seed each year.

The progress made is well illustrated by the highest yield obtained each year since the Competition started:—

Highest Yield from 1lb. of Seed Potatoes, Mount Compass.

Year.	Winner.	Highest Yield.	Second Highest Yield.
1932	Kelvin Peters	108lbs.	—
1933	Linton Jacobs	217lbs.	—
1934	Don McKinley	278lbs.	268lbs.
1935	Don McKinley	270lbs.	261½lbs.

At the request of the Branch, the writer was present at the digging this year, and in association with the local stewards supervised the work and weighed the potatoes. The digging was done in most instances by the competitor's father or older brother,

while the actual competitor, with commendable keenness, was close handy—sometimes dangerously so—to see that no tubers were left in the ground. The whole-hearted manner in which the adults entered into proceedings was a feature, and the boys with this practical support can be expected to remain enthusiastic. Certainly there was no lack of enthusiasm on this occasion.

Cutting and planting was done on October 27th, 1934, and the number of sets obtained by the lads from 1lb. of seed was remarkable, ranging from 83 down to 40. It would appear, however, from the general appearance of the plots that a very high number is not desirable, as growth was not uniform throughout the largest plots. Five of the lads certainly dug their complement of sets, but the yields were not evenly distributed, many dwarfed plants giving negligible returns. Presumably some sets lacked the necessary vitality to carry them successfully through the season. Most of the potatoes were grown in swamp land with soil of a black peaty nature, and the dry season experienced did not affect them; in fact, two lads had their yields reduced by 15lbs. and 11lbs. because of the effects of moisture on the tubers. From the results obtained up to date the maximum number of sets appears to be about 50.

Fertilisers and the quantities used covered a wide range. Both cow and fowl manures were extensively used in addition to artificial fertilisers. Unfortunately no definite records of weight were kept, but heavy dressings were the rule. From the commercial point of view, where clean skinned potatoes are required, some of the dressings of farmyard manure were not in the best interests of the crop. Probably an alteration in the time of application would make an appreciable difference.

Digging was done on March 6th and 7th, 1935, and the following table gives the results:—

Yields of Potato Competition, 1935, *Mount Compass School Boys.*

Competitor.	Sets planted.	Sets shot.	Sets dug.	Yield. lbs.
Don McKinley	70	70	70	270
Brian Simons	80	78	65	261½
Linton Jacobs	59	59	59	223½
Alex Anderson	63	60	54	218½
Ross Williamson	58	58	58	209
Ray Chigwidden	63	63	63	182½
Kelvin Peters	40	28	22	174
Douglas Chigwidden	54	54	54	167½
Ben Peters	40	31	22	164½
Sam Miller	53	37	37	146½
Ralph Coles	47	46	46	109½
Noel Jacobs	83	83	50	107

The winner, Don McKinley, is to be congratulated on his success in the Competition. Twelve months ago he also won with the record figure, or only 8lbs. more than this year. This lad has now left school and is no longer eligible to compete. Brian Simons, who is only eight years old, put up a splendid performance, and as he will be a competitor for some years to come he has opportunities of breaking the present record. Kelvin Peters obtained the heaviest yield from one set, viz., 26lbs., and Sam Miller the heaviest potato, 4½lbs.

Probably the most interesting feature of the Competition is the planting distance as a guide to the average acreage yield. The general average this year was about 3ft. both in and between the rows, and whilst yields obtained from 1lb. of seed were high, this wide planting affected the average acreage yield rather surprisingly. What is remarkable, however, is the small amount of seed that would be required per acre to give these results, based on the figures obtained this year. To illustrate this point the prizewinners' plots are summarised below:—

Competitor.	Area occupied by sets. Sq. yards.	Yield from 1lb. of seed. lbs.	Yield per acre. t.	c.	Quantity of seed required per acre. lbs.
Don McKinley	60	270	9	14½	81
Brian Simons	48	261½	11	15	101

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO. LIMITED reported on April 1st, 1935:—

BUTTER.—Since our last report the London butter market has shown some improvement after a sagging in prices, and at date of report sales of Australian choicest were being made at 74s. per cwt., but, under the Equalization Plan, the rates in the local market have continued steady. Production has declined to minimum, and the general rains received in March have resulted in the grass having made a start in most districts. If following rains are received this month the outlook should be promising. Present rates are:—Choicest creamery fresh butter in bulk, 1s. 4½d. per lb.; prints and delivery extra. (This price is for local sale only, and, under the quota system, the equalised price manufacturers will receive will be 1s. per lb., on which basis payments to cream suppliers will be calculated.) Separator lines from 9d. to 1s. 1d. per lb. for choicest; stores, 6d. to 8d. per lb. (these prices are subject to Equalization Levies).

CHEESE.—As with other dairy products this commodity is shortening in supply, although, with the development which has taken place in the South-East, there are still more than sufficient quantities being manufactured than for the corresponding period last year, and one or two more shipments will go forward to Britain before the close of the season. Meanwhile, there are ample quantities for local and interstate trade and values have continued steady at: Large and medium, from 8½d. per lb.; loaf, from 9d. per lb. at store door, delivery extra; semi-matured and matured, 10d. to 10½d. per lb.

EGGS.—As is usual at this time of the year, supplies are cutting off, and, under this influence and the improved rates ruling in the Eastern States, values firmed, and at date rule as follows:—Ordinary country eggs, fair average quality, 9d. per dozen net; long distance rail or shipping eggs lower. Selected new laid clean eggs, 1⅞ozs. and over, 11d. to 11½d. per dozen net.

BACON.—With the setting in of cooler weather the consumption of bacon increased, but this was only to be expected, and extra supplies were received from the factories from week to week. The quantities of live hogs offering in the various markets were well maintained, so that stocks of bacon in process of curing are ample for all forward requirements. The sale of hams is now shortening, which is usual when the winter season approaches. Rates are:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d to 11d.; heavy middles, 9d. to 9½d.; rolls, 8½d. to 9d.; hams, 1s. 1d. to 1s. 2d.; cooked hams, 1s. 3d. to 1s. 4d. per lb.

ALMONDS.—Much heavier quantities were marketed last month, but good interstate and local trade cleared parcels and rates improved. Also, there was a very ready demand experienced for kernels, and all lots were cleared satisfactorily. Quotations are:—Softshells and Brandis, 8½d. to 9½d. per lb.; hardshells, 5½d. per lb.; kernels, 1s. 10d. to 1s. 11d. per lb.

HONEY.—Although there was a slightly improved sale for honey, the turnover was disappointing in view of the heavy stocks held by distributing merchants, and market continues somewhat depressed. Quotations were without change, being:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades, 1d. to 2d. per lb.

BEESWAX was in better supply throughout the month, and all good quality lots sold readily at 1s. 4d. to 1s. 4½d. per lb. according to quality. Discoloured lines lower.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday, and our sale rooms are the best equipped in South Australia. Clearing sales arranged in any part of the State. With the approach of Easter the demand for poultry has increased and there were heavier supplies offering at each market. The demand was more particularly for prime quality heavy weight table birds, although the smaller sorts, such as Leghorns, were cleared from sale to sale at prices commensurate with the size and quality. We advise consigning Crates loaned free on application. The following are prices realised:—Prime roosters, 3s. 9d. to 4s. 6d.; nice conditioned cockerels, 3s. to 3s. 8d.; fair conditioned cockerels, 1s. 9d. to 2s. 9d.; chickens lower. Heavyweight hens, 1s. 11d. to 2s. 7d.; medium hens, 1s. 6d. to 1s. 10d.; light hens, 11d. to 1s. 3d.; couple of pens of weedy sorts lower Prime young Muscovy drakes, 3s. to 4s.; young Muscovy ducks, 1s. 9d. to 2s. 3d.; ordinary ducks, 1s. to 1s. 9d.; ducklings lower. Geese, 3s. to 4s.; goslings lower. Turkeys, good to prime condition, 8d. to 10d. per lb. live weight; do., fair condition, 6d. to 7½d. per lb. live weight; do., poor and crooked breasted lower. Pigeons, 3½d. to 4d. each.

POTATOES.—New season's, 9s. per cwt.

ONIONS.—Brown Spanish, 9s. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING FEBRUARY, 1935.

IMPORTSS.

Interstate.

Apples (bushels)	33
Bananas (bushels)	12,025½
Citrus—	
Grape Fruit (bushel)	1
Lemons (bushels)	2
Oranges (bushels)	22
Mangoes (bushel)	1
Passion Fruit (bushels)	2½
Peaches (bushels)	7
Pears (bushel)	1
Pineapples (bushels)	691
Plums (bushels)	2
Peanuts (bags)	222
Peanuts Kernels (bags)	70
Carrots (bags)	39
Potatoes (bags)	658
Bulbs (packages)	56
Peat (bags)	6
Plants (packages)	16
Seeds (packages)	30
Wine Casks (No.)	2,244
Fumigated—	
Citrus—	
Lemons (bushels)	2
Peat (bags)	6
Wine Casks (No.)	121
Rejected—	
Bananas (bushels)	144
Second-hand bags (No.)	66

Overseas.

(State Law.)

Wine Casks (No.)	2,051
Fumigated—Wine Casks (No.)	131

Federal Quarantine Act.

	Packages.	lbs.
Seeds, &c.	1,586	197,239
Canes	114	—
Cocoanut (chests)	170	—
Tea (chests)	1,361	—
Plants	7	4,624 (No.)
Timber	175,291	3,652,210 Sup. ft.

EXPORTS.

Federal Commerce Act.

		Packages.
England	Pears	12,927
India	Apples	639
	Grapes	45
Netherlands, East Indies	Apples	18
	Nectarines	5
	Peaches	10
	Pears	8
	Plums	142
	Vegetables*	1
New Zealand	Bulbs	1
	Seed Clover	277
Singapore	Apples	75
	Citrus—Lemons	2
	Nectarines	14
	Peaches	34
	Pears	70
	Plums	74
	Vegetables*	79
Straits Settlements	Pears	6
	Plums	6
	Vegetables*	5

* Potatoes excluded.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of March, 1935, also the average precipitation for March, and the average annual rainfall.

Station.	For March 1935.	Av'ge. for March.	Total Rain for 1935.	Av'ge. Annual Rain-fall.
Far North and Upper North.				
Oodnadatta	0·07	0·44	1·02	4·66
Marree	—	0·53	0·75	5·88
Farina	0·05	0·67	0·87	6·43
Copley	0·05	0·70	0·54	7·87
Beltana	0·28	0·71	0·59	8·48
Blinman	0·24	0·78	0·44	11·86
Hookina	0·48	0·68	1·11	11·25
Hawker	0·36	0·61	1·05	12·26
Wilson	0·50	0·59	1·41	11·79
Gordon	0·58	0·74	1·15	10·53
Quorn	0·90	0·60	1·55	13·22
Port Augusta	1·29	0·72	2·79	9·44
Bruce	0·73	0·71	1·49	9·87
Hammond	1·23	0·67	2·13	11·21
Wilmington	1·05	0·80	1·86	17·32
Willowie	1·06	0·72	1·99	12·25
Melrose	2·65	1·07	4·00	22·88
Booleroo Centre	1·25	0·67	2·31	15·21
Port Germein	1·86	0·75	2·18	12·53
Wirrabara	1·80	0·95	2·58	19·29
Appila	1·36	0·88	3·40	14·65
Cradock	0·45	0·57	1·11	10·82
Carrieton	0·77	0·58	1·13	12·23
Johnburg	0·66	0·55	0·97	10·58
Eurelia	0·75	0·60	1·16	12·79
Orroroo	0·70	0·64	1·70	13·20
Nackara	0·49	0·83	0·65	11 09
Black Rock	0·68	0·69	1·21	12·37
Oodlawirra	0·57	0·73	1·13	11·68
Peterborough	1·60	0·72	2·36	13·22
Yongala	1·26	0·67	2·11	14·44
North-East.				
Yunta	0·30	0·58	0·42	8·55
Waukaringa	0·46	0·59	0·66	7·94
Mannahill	0·30	0·54	0·54	8·20
Cockburn	0·20	0·50	0·42	7·96
Broken Hill, N.S.W.	0·16	0·63	0·50	9·56
Lower North.				
Port Pirie	2·23	0·82	4·14	13·21
Port Broughton	2·85	0·61	4·46	13·88
Bute	1·83	0·66	1·97	15·44
Laura	2·02	0·85	3·56	17·95
Caltowie	1·78	0·83	3·18	16·74
Jamestown	1·33	0·86	2·47	17·69
Gladstone	1·99	0·73	4·00	16·29
Crystal Brook	2·78	0·70	5·03	15·78
Georgetown	1·60	0·82	3·55	18·37
Narridy	1·58	0·80	3·46	15·82
Redhill	1·77	0·72	3·91	16·59
Spalding	1·52	0·80	3·24	18·88
Gulnare	1·54	0·72	3·32	18·68
Yacka	1·23	0·65	3·10	15·39
Koolunga	1·39	0·66	3·30	15·38
Snowtown	1·76	0·72	2·84	15·74

Station.	For March 1935.	Av'ge. for March.	Total Rain for 1935.	Av'ge. Annual Rain-fall.
Lower North—*continued.*				
Brinkworth	1·48	0·77	3·45	15·82
Blyth	1·83	0·74	3·78	16·78
Clare	2·38	1·03	4·22	24·51
Mintaro	2·17	0·91	3·67	23·42
Watervale	3·07	1·12	5·09	26·80
Auburn	3·10	1·10	4·53	23·98
Hoyleton	2·44	0·79	3·59	17·33
Balaklava	1·76	0·72	2·86	15·46
Port Wakefield	1·24	0·91	2·12	12·94
Terowie	0·93	0·64	1·55	13·35
Yarcowie	1·26	0·78	1·91	13·59
Hallett	1·62	0·67	3·12	16·46
Mount Bryan	1·42	0·70	3·18	16·83
Kooringa	1·47	0·87	2·55	17·85
Farrell's Flat	1·44	0·75	2·60	18·61
West of Murray Range.				
Manoora	2·07	0·82	3·56	18·92
Saddleworth	2·60	0·93	3·83	19·60
Marrabel	2·60	0·85	3·66	19·96
Riverton	3·48	1·00	4·41	20·81
Tarlee	1·57	0·81	2·45	18·10
Stockport	1·76	0·80	2·50	16·93
Hamley Bridge	1·87	0·78	2·58	16·54
Kapunda	1·86	0·99	2·64	19·79
Freeling	2·29	0·88	3·41	17·83
Greenock	2·50	0·95	3·43	21·53
Truro	2·07	0·94	2·83	19·89
Stockwell	2·13	0·88	2·79	20·13
Nuriootpa	2·44	0·92	3·38	20·72
Angaston	2·02	0·99	2·80	22·42
Tanunda	2·66	1·02	3·84	22·02
Lyndoch	1·93	0·85	2·93	23·40
Williamstown	2·46	0·97	3·43	27·77
Adelaide Plains.				
Owen	1·90	0·55	2·86	14·66
Mallala	1·47	0·76	2·18	16·56
Roseworthy	2·05	0·81	3·05	17·40
Gawler	1·90	0·91	2·83	18·91
Two Wells	1·31	0·78	3·40	15·75
Virginia	2·05	0·85	3·25	17·18
Smithfield	2·35	0·89	3·63	17·64
Salisbury	2·53	0·95	3·56	18·56
Adelaide	2·46	1·02	3·26	21·15
Glen Osmond	2·62	1·03	3·61	26·05
Magill	2·60	1·16	3·71	25·53
Mount Lofty Ranges.				
Teatree Gully	3·08	1·23	4·44	27·20
Stirling West	4·86	1·80	6·99	47·08
Uraidla	4·10	1·80	6·15	44·19
Clarendon	4·00	1·49	5·26	32·88
Happy Val'y Res.	2·68	—	3·46	—
Morphett Vale	2·35	1·12	3·04	22·66
Noarlunga	2·30	1·02	2·99	20·37
Willunga	2·66	1·22	3·27	26·02
Aldinga	2·14	1·06	2·59	20·27

RAINFALL—*continued.*

Station.	For March 1935.	Av'ge. for March.	Total Rain for 1935.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*				
Myponga	2·94	0·95	3·69	29·50
Inman Valley	1·98	—	3·04	20·68
Yankalilla	1·57	1·19	1·99	22·83
Mount Pleasant	1·34	1·10	2·22	27·23
Birdwood	2·22	1·07	3·57	29·21
Gumeracha	2·81	1·28	4·09	33·41
Millbrook Res.	3·67	0·93	5·28	34·68
Tweedvale	2·95	1·25	4·39	35·99
Woodside	1·77	1·18	3·30	32·31
Ambleside	2·68	1·35	4·12	34·90
Nairne	1·71	1·28	3·42	28·22
Mount Barker	2·14	1·35	3·69	31·31
Echunga	2·50	1·44	4·31	33·30
Macclesfield	2·14	1·40	3·41	30·43
Meadows	3·03	1·66	4·34	36·16
Strathalbyn	1·10	1·04	2·04	19·31
Murray Flats and Valley				
Meningie	1·42	0·90	2·23	18·37
Milang	1·24	0·80	1·73	14·91
Langhorne's Ck.	1·03	0·92	1·72	14·87
Wellington	1·61	0·87	2·48	14·65
Tailem Bend	1·54	1·01	2·49	15·06
Murray Bridge	0·83	0·90	1·54	13·56
Callington	0·51	0·84	1·24	15·19
Mannum	0·77	0·84	1·33	11·49
Palmer	0·74	0·87	1·06	15·63
Sedan	0·61	0·69	0 84	12·11
Swan Reach	0·58	0·76	1·09	10·64
Blanchetown	0·68	0·81	·102	11·01
Eudunda	1·78	0·81	2·68	17·17
Pt. Pass	1·80	0·58	2·76	—
Sutherlands	0·95	0·65	1·44	10·84
Morgan	0·73	0·54	1·05	9·17
Waikerie	0·80	0·54	1·19	9·65
Overland Corner	0·58	0·81	1·16	10·32
Loxton	0·76	0·84	1·35	11·54
Berri	0·73	0·42	1·64	10·17
Renmark	0·65	0·68	1·25	10·41
West of Spencer's Gulf				
Eucla	3·82	0·84	4·52	9·96
Nullarbor	2·76	0·71	2·85	8·81
Fowler's Bay	2·13	0·52	2·48	11·94
Penong	2·01	0·54	2·40	12·27
Koonibba	2·57	0·57	2·89	12·13
Denial Bay	2·19	0·55	2·42	11·36
Ceduna	2·54	0·50	2·78	10·16
Smoky Bay	2·37	0·36	2·49	10·53
Wirrulla	3·07	0·40	3·96	10·54
Streaky Bay	3·23	0·54	3·45	14·88
Chandada	2·86	—	3·20	—
Minnipa	2·47	0·50	3·05	14·06
Kyancutta	2·75	—	3·36	—
Talia	2·73	0·48	2·73	14·76
Port Elliston	2·50	0·53	3·13	16·54
Lock	2·59	0·47	2·80	16·52
Mount Hope	2·61	—	2·99	—
Yeelanna	1·64	0·53	2·33	15·94
Cummins	1·97	0·33	2·23	17·60
Port Lincoln	1·72	0·82	2·11	19·42
Tumby	1·29	0·64	1·64	14·12
Ungarra	1·56	0·70	2·30	16·85
Port Neill	0·89	0·61	1·26	13·09
West of Spencer's Gulf—*continued.*				
Arno Bay	1·25	0·72	1·75	12·65
Rudall	1·91	0·45	2·30	12·64
Cleve	1·66	0·78	2·31	14·83
Cowell	1·05	0·81	1·75	11·07
Miltalie	1·37	0·97	2·73	13·67
Mangalo	1·67	0·73	2·41	13·[illegible]1
Darke's Peak	1·95	0·48	2·71	15·18
Kimba	1·19	0·50	2·51	11·82
Yorke Peninsula.				
Wallaroo	2·24	0·81	3·50	13·98
Kadina	2·14	0·87	3·24	15·64
Moonta	1·14	0·86	2·11	15·06
Paskeville	1·65	0·75	2·42	15·49
Maitland	2·11	0·85	3·62	19·90
Ardrossan	1·00	0·74	1·82	13·97
Port Victoria	1·45	0·67	2·05	15·44
Curramulka	1·33	0·88	1·78	17·87
Minlaton	1·36	0·83	1·72	17·79
Port Vincent	1·00	0·64	1·42	14·43
Brentwood	1·31	0·73	1·62	15·55
Stansbury	1·19	0·78	1·55	16·82
Warooka	1·12	0·67	1·39	17·49
Yorketown	1·60	0·74	1·97	16·88
Edithburgh	1·19	0·81	1·63	16·37
South and South-East.				
Cape Borda	1·99	0·88	2·55	24·82
Kingscote	1·33	0·81	1·56	19·14
Penneshaw	1·48	0·73	1·85	18·92
Victor Harbour	1·55	1·01	2·11	21·37
Port Elliot	1·13	1·01	1·61	19·93
Goolwa	1·30	0·97	1·89	17·85
Maggea	0·84	0·48	1·37	10·04
Copeville	0·99	0·71	1·61	11·51
Claypans	0·64	0·55	1·26	10·38
Meribah	0·91	0·53	1·59	11·31
Alawoona	0·82	0·39	1·20	10·36
Caliph	0·86	—	1·15	—
Mindarie	0·70	0·50	1·32	12·21
Sandalwood	0·90	0·64	1·62	13·66
Karoonda	1·30	0·68	2·18	14·36
Pinnaroo	0·57	0·91	1·22	14·43
Parilla	0·93	0·67	1·43	13·82
Lameroo	0·92	0·81	1·48	15·97
Parrakie	1·45	0·80	2·32	14·62
Geranium	1·51	0·89	2·55	16·51
Peake	1·53	1·02	2·32	16·01
Cooke's Plains	1·68	0·95	2·32	15·30
Coomandook	1·74	0·96	2·42	17·09
Coonalpyn	2·26	0·89	3·03	17·61
Tintinara	2·22	0·91	3·19	18·71
Keith	1·74	0·79	2·23	17·92
Bordertown	1·73	0·82	3·11	19·21
Wolseley	1·57	0·77	2·53	18·49
Frances	2·31	0·92	2·95	20·11
Naracoorte	2·81	1·02	4·01	22·66
Penola	2·93	1·24	4·11	26·01
Lucindale	2·81	1·01	4·12	23·34
Kingston	1·66	1·01	2·59	24·28
Robe	2·06	1·03	3·09	24·67
Beachport	2·01	1·17	3·29	27·09
Millicent	2·73	1·32	4·32	29·79
Kalangadoo	2·88	1·19	4·58	32·28
Mount Gambier	2·69	1·43	4·17	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

INDEX TO BUREAU REPORTS—*continued.*

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying.	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Tantanoola	2/3/35	10	Address—J. Altschwager	L. Osborne
Mount Gambier	8/3/35	12	Discussion	G. Gurry
Allandale East .	21/3/35	9	Annual Meeting	R. Laslett

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WILMINGTON (Average annual rainfall, 17.32in.).

February 12th.—Attendance: 15.

HARVEST REPORTS.—Most crops were badly affected by grasshoppers and to a less extent from hail. Late sown varieties gave the best returns. Lodging was not responsible for any appreciable loss, Nabawa being the only variety to suffer in this respect. During the latter part of harvest, heavy wind was experienced and this had a depressing effect on yields. The grain was somewhat bleached with a corresponding drop in the bushel weight. Ranee was reported as having yielded the best crop: 9 bags to the acre. Reporting on the different varieties, Mr. E. L. Orchard (District Agricultural Instructor) said Sword was badly knocked about and in some crops traces of bunt were detected. Ranee, with its short growth, yielded as well as any variety through the north. Nabawa was badly injured by heavy winds. Ghurka, only recently introduced to the district, will most likely replace Nabawa. Quality: a variety for which the millers were offering a premium, but was very subject to shaking and inclined to lodge. Dundee is a high quality milling wheat for which higher prices than f.a.q. would be paid by the mills. A decided falling off was noted in the sowing of Ford. (Secretary: C. Cole.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wilmington	12/2/35	16	"Colt Breaking," J. Zinmermann	C. Cole
Wilmington	12/3/35	52	Address—J. O. Hatter ..	C. Cole
Wirrabara......	3/11/34	12	Congress Report	F. Borgas

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BLYTH (Average annual rainfall, 16.80in.).
March 1st.—Attendance: 8.

HARVEST REPORTS.—Mr. W. Eime reported favourable crops notwithstanding the lean rainfall. Sword 18bush., and Bencubbin 32bush. Mr. H. E. Zweck, fair crops of Ranee and Bencubbin, the latter variety being very tough to reap after rain. Mr. R. Eime—favourable crops of Ranee and Sword; a farm average of 18bush. over 605 acres.

WIRRABARA (Average annual rainfall, 19.29in.).
February 19th.—Attendance 12.

Mr. E. L. Orchard presented Life Membership Certificates of the Agricultural Bureau to Messrs. W. H. Jettner, B. Joppich, W. Stephens and C. H. Curnow.

HARVEST REPORTS.—Mr. W. H. Stevens reported: O.B. 27bush., Sword, which shook badly, 15bush., Canberra 24bush., Ranee 19bush., Ranee 4II, 27bush., Nabawa 27bush; farm average, 24bush. Mr. B. C. Joppich—Gallipoli 27bush., Ranee 4II, 21bush; farm averge 21bush. Mr. W. H. Stephens—Ranee 4II, 18bush., Early African and Merriden, 15bush., Nabawa 17bush., Waratah 14bush. Mr. F. Borgas—Federation, 17bush., Sword 18bush., Nabawa 21bush.; farm average, 18bush. (Secretary: F. Borgas.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Appila	1/3/35	9	Paper from *Journal*	E. Wurst
Gladstone	15/2/35	10	Harvest Reports	M. Hoare
Narridy	2/3/35	29	Address—J. Rundle	J. Klingner
Beetaloo Valley	18/3/35	14	Conference Report	B. Giddings
Wandearah	21/3/35	15	Address—E. L. Orchard	L. Jacobs
Gladstone	29/3/35	100	Address—F. Francis	M. Hoare

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

SADDLEWORTH (Average annual rainfall, 19.60in.).
February 22nd.

DAIRYING: THE MAIN SIDELINE ON THE FARM.—Mr. A. Marrett read the following paper:—"The first essentials for success in dairying are that the farmer be in sympathy with his work and have a natural liking for the handling of dairy cows. South Australia cannot be regarded as an ideal State for dairying; nevetheless, much depends on this industry from a farmer's point of view. It should be the aim of those who take up this sideline to obtain a good class of cow and head the herd with a bull of proved parents. If this is done there will be more interest taken in the cows and they will receive more attention. This will result in better feeding. There no is need to go to extremes and stuff the cows. Perhaps the best guide is 2½lbs. of bran and oats to every gallon of milk produced. The cows will appreciate a change of pasture and respond by maintaining their milk yield. Pigs go hand in hand with cows. During the past 2 years there has been more money in pigs than in dairying. The farmer who keeps cows and has surplus milk should either breed pigs or purchase animals for fattening. The former is the more profitable method, but with the latter less labour is required. I carried out tests with the following types of pigs:—Large White, Large White x Berkshire, Large White x Tamworth and pure Berkshire. All were bought as suckers and each given as much milk and dry crushed barley as they could consume for 1 month. The pigs were kept in a pen supplied with plenty of water and a self feeder. The Large White pure-bred weighed 65lbs. at 57 days, Large White x Berkshire at 57 days weighed 65lbs., and realised 1s. less. The Pure Berkshire at 75 days weighed 65lbs. and was sold for 2s. less. The Large White x Tamworth tipped the scale at 80lbs. when 97 days old and was sold for 4s. less. I buy about 20 pigs each month and because there are not enough animals of the right type that come into the market I have to obtain them on farms." Many farmers, he thought, could with advantage use better cows, and too often the boar that was used was of a poor type. (Secretary: F. W. Coleman.)

SUTHERLANDS (Average annual rainfall, 10.84in.).

March 7th.—Attendance: 11.

A REVIEW OF THE PAST SEASON.—Mr. W. Doecke read a paper on this subject. He first reviewed the climatic conditions that prevailed during the year, the rainfall totalling 10.78in. Over the district he estimated the hay yield to be in the vicinity of 15cwts. to the acre and wheat 5bush. Because of the late spring rains and the second growth that came up in the late sown crops, reaping could not be started until the middle of September. Wheat harvested prior to New Year's Day was very plump, but the rain that fell following 1st January caused a good deal of pinched grain. Grasshoppers did some damage towards the end of the year. On the whole the season had been a trying one and had again proved the necessity for the light working of the land and doing all cultural operation at correct times. (Secretary: C. R. Schiller.)

WASLEYS.

February 14th.—Attendance: 14.

HARVEST REPORTS.—Reports were given by Messrs. L. Mackereth and R. Sires: Barley, all the grain was of No. 1 sample, the best returns being from fallow land, 13 bags to the acre. Light grey land cultivated in March, 7 to 8 bags. Barley on wheat stubble, 4 to 6 bags. Oats on fallow yielded 10 bags to the acre and cut 1½ tons for hay. Oats on stubble, 7 to 8 bags per acre. The following returns were obtained from wheat:—Nabawa 27bush., Sword 24, Ranee 21. All crops were exceptionally clean. Malting Barley—All plots seeded at the rate of 65lbs. of seed per acre: 90lbs. super, 25bush. 18lbs.; 80lbs. super and ammonia: 27bush. 16lbs. Average, 26bush. 34lbs. Oats and wheat mixed—Nabawa wheat and Cape oats, 2 tons per acre. Ford and Nawab wheat cut for hay, 1¾ tons per acre. Grain yields, 12½bush. (Secretary: C. Currie.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Greenock	18/2/35	22	Addresses—D. Farmer and M. Hamdorf	A. Schubert
Penwortham	28/2/35	16	Address—J. Morcom	A. Jenner
Truro	18/2/35	18	Harvest Reports	L. Davis
Rosedale	18/2/35	14	Annual Meeting	S. Simcock
Snowtown	8/3/35	6	Harvest Reports	A. Hocking
Upper Wakefield	21/2/35	12	Harvest Reports	H. Gregor
Stockport	13/3/35	17	Address—W. C. Johnston	L. Klaffer
Buchanan	15/3/35	16	Address—W. C. Johnston	L. Bell
Truro	18/3/35	50	Social	L. Davis
Light's Pass	18/3/35	15	Addresses—Messrs. C. Verrall and P. Mader	C. Verrall
Koonunga	20/3/35	20	Address—F. Guster	H. Mibus
Lyndoch	19/3/35	15	Address—M. Aird	J. Hammat
Tarlee	19/3/35	12	Papers—Messrs. L. Molineux and H. Pearson	N. Clarke
Upper Wakefield	21/3/35	10	Papers—Messrs. B. and C. Cleary	H. Gregor
Owen	11/3/35	21	Address—Mr. Goodale	M. Freebairn
Brownlow	20/3/35	14	"Fire Fighting"	A. Steinborner
Black Springs	19/3/35	11	Question Box	K. Dunn
Rosedale	18/3/35	18	Address—F. E. Waddy	S. Simcock
Roseworthy	30/4/34	13	Address—W. J. Spafford	S. Bowden
Roseworthy	25/6/34	14	Address—R. Baker	S. Bowden
Roseworthy	26/7/34	200	Social	S. Bowden
Roseworthy	27/8/34	24	Address—Dr. Callaghan	S. Bowden
Roseworthy	24/9/34	20	Addresses—W. H. Cowper and A. H. Codrington	S. Bowden
Roseworthy	—/10/34	—	Visit to Taylor Bros.	S. Bowden
Roseworthy	21/1/35	19	Harvest Reports	S. Bowden
Roseworthy	16/2/35	29	Address—T. Mitchell	S. Bowden
Roseworthy	18/3/35	30	Address—Prof. Prescott	S. Bowden

YORKE PENINSULA DISTRICT.

BOOR'S PLAINS (Average annual rainfall, 15.64in.).
February 7th.—Attendance: 19.

HARVEST REPORTS.—Mr. M. Wright, in his report, said crops were very free from disease, but the heavy winds in November were responsible for the shaking of the early varieties. The sample in most cases was very good. Sword and Waratah on fallow, 18bush.; Ranee, 24bush.; Free Gallipoli, 21. Wheat on grassland, 12bush. Hay cuts were in most cases ilght, and yielded ¾ ton to the acre. Barely was of a good sample, the yield being about 15bush. (Secretary: S. Chynoweth.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Brentwood	8/11/34	8	" Stripper versus Harvester," H. Anderson	J. Boundy
Bute	18/3/35	8	Address—C. A. Goddard	H. Perry
Kilkerran	18/3/35	12	" Sheep versus Wheat," A. Sawade	A. Sawade
Weavers	25/2/35	6	Question Box	H. Cornish

WESTERN DISTRICT.

ROBERTS AND VERRAN.
February 13th.

HARVEST REPORTS.—Mr. S. Barber—Average yield, 3bush., due to the ravages of grasshoppers. Mr. K. Masters—9bush. farm average; 250 tons of hay and 40 tons of ensilage were conserved. Early Burt oats on fallow cut 1 ton of hay to the acre. Ranee on grassland, 13bush., Gluyas on fallow 9bush., and Sword 7bush. Mr. A. Ramsey —Wheat on fallow 9bush. Mr. H. Smith reported very extensive damage from hoppers, prior to their attacks he estimated crops at 15bush. Dry weather and severe damage by hoppers were the reasons for the low yields on Mr. C. Masters' farm. (Secretary: C. Masters.)

YADNARIE (Average annual rainfall, 14.09in.).
February 12th.—Attendance: 30.

Mr. H. D. Adams (District Agricultural Instructor), on behalf of the Advisory Board of Agriculture, presented to Mr. J. Quick a certificate conferring on the recipient the honour of Life Membership of the Agricultural Bureau. Mr. Quick has been actively associated with the Bureau for 20 years, and during that time has occupied every office in connection with the Branch. Mr. Spriggs presented the trophies to the successful competitors in the Jervois Wheat Crop Competitions. (Secretary, E. A. Spriggs.)

WATER CONSERVATION ON THE FARM.

Paper read by Mr. C. Zippell (Hon. Secretary of the Wallalla Branch), at a meeting held on November 14th.

One of the many problems confronting the settler in the lighter rainfall districts is the insufficient supply of water, without which he is unable to develop his holding or carry the necessary stock to make farm sidelines a paying proposition. In districts where no underground supplies exist, preparations have to be made for surface catchment with underground tanks or dams for storage; whilst in districts where the soil is of a more sandy nature, artificial catchments have been made, such as laying out large quantities of galvanized iron or treating areas with asphalt. Both of these types of catchment assure water being added to the storage after every shower of rain.

It is usual in districts where the soil sets readily to rely on private or public roads and tracks for catchment purposes. Whatever method or catchment is used, it is always advisable to build sufficient tanks to hold at least 12 months' supply. This should avoid the possibility of water carting during summer. Providing there are suitable catchment areas, small tanks should be built on various parts of the farm, so that water can be readily available to each paddock. The addition of a small overhead tank, with windmill attachment, troughs, and ball-taps, on the main storage tanks, will ensure a plentiful supply of water to stock during the farmer's absence from home, should this be necessary for a few days.

The method of constructing underground tanks varies a good deal according to circumstances and districts. Certain types or soil make it difficult at times to decide the class of material which will give the best and most economical results in tank building. The following are some of the methods more generally known and used:—

Method No. I.—Squatter's tank.
Method No. II.—Stone mason work.
Method No. III.—Lime concrete.
Method No. IV.—Cement concrete.

The squatter's tanks are made of light steel plates of various sizes, bolted together in the position in which they are to remain. The cost of this type of tank is approximately £5 per 1,000 gallons, and is much too costly for the farmer. Therefore, no further mention of this type is necessary.

Stone mason work is perhaps the oldest method of tank-building and has given satisfactory results when care was taken to see that when building the walls the correct class of stone and mortar were used, that the correct ties were made—not only in the corners, but throughout the whole wall. The wall must also be properly backed up when building.

Lime concrete is also extensively used, good results being obtained when care is taken to leave the face of the wall rough, with plenty of stone showing. Too much mortar should not be left on the face of the wall, as the cement coating will not adhere to a lime surface, and will eventually leave the wall and crack.

With the two foregoing methods the only cash outlay to the farmer is the purchase of cement to complete the job.

Cement Concrete.—This method, although it must be considered the best, has not been generally used for tank building on the farm, chiefly on account of its costliness. It requires much more cement than the methods previously mentioned, yet, when time is taken into consideration, cement concrete may not prove so costly when compared with other methods. With both stone mason work and lime concrete a large quantity of stone is necessary. This entails a good deal of work by way of stone raising, carting, and lime burning.

A good material which can be thoroughly recommended for cement concrete work, and has proved its worth in the past for various building purposes, is beach shells. These when mixed with cement in proportion of 6 to 1 give good results in tank walls. A wall 6in. thick of this mixture would have sufficient strength for a farm tank of any size, and if reinforced with cyclone fence wire, will give a lifetime job for both under and over ground tanks. Whichever type of wall is built, only reliable material should be used and the walls of underground tanks built a foot above the ground level. Earth should also be placed that height around the tank to prevent the possibility of water getting behind the walls. Tank walls and floors should receive a priming coat of cement of a 4 to 1 mixture and a final coat of 2 to 1 mixture. In addition, a cement wash is also recommended to guard against any flaws caused by trowelling. As soon as the cement is firm enough, water should be placed in the tank to prevent the cement from drying out too quickly. A covering should also be placed over the tank to prevent damage from the sun. Farm tanks can and should be one of the most permanent improvements on the farm. A good tank, well built, is a credit to the builder, as well as an asset to the farm, and also another step towards assuring sufficient water for the farmer to carry the required stock.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warramboo	1/3/35	9	Annual Meeting	H. Chilman
Kyancutta	5/3/35	11	Congress Reports	E. Kelly
Kelly	9/3/35	—	Social	F. Illman
Miltalie	16/2/35	8	Question Box	G. Smith
Mount Hope	19/3/35	10	Question Box	J. Vigar
Pygery	19/3/35	10	Congress Report	A. Day
Yadnarie	20/3/35	10	Paper—E. Spriggs	E. Spriggs

EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Lameroo	22/2/35	6	Discussion	A. Potter
Coonalpyn	20/3/35	10	Discussion	C. George
Kulkawirra.....	19/3/35	8	Discussion	H. Elliot
Ramco	1/2/35	—	Homestead meeting	J. Odgers
Yurgo	29/3/35	10	Annual meeting	H. Mackenzie

SOUTH AND HILLS DISTRICT.

FRAYVILLE.

February 14th.—Attendance: 9.

HARVEST REPORTS.—The following reports were received:—Mr. W. Lindner—Ranee, 10bush.; Nabawa and Nawab, 12bush.; Sword—poor germination—12bush.; Ghurka, 15bush. Mr. H. A. Helbig—farm average 18bush., the best wheats being Ranee and Nabawa. Mr. L. Eichler—Ranee, 20bush.; Ford, 18bush.; Nabawa, 17bush.; Crossbred, 16bush. Mr. H. B. Scheer—Aussie and Nabawa on stubble, 10bush.; Sword, 15bush. Mr. G. Faehrmann—Ranee, 7bush.—due to frost—Nabawa, 15bush.; Ghurka, 18bush. Mr. H. Rosenzweig—Farm average of 15bush. Mr. H. Ramm—Nabawa and Ranee, 15bush. Mr. S. Bretag—Sword and Nabawa, 20bush.; Ranee, 19bush.; Ghurka, 17bush. The Chairman reported on the carbonate of lime experimental plots; the following being the results:—No manure, 13bush. 35lbs.; 1cwt. carbonate of lime, 13bush. 27lbs.; 1cwt. super, 20bush. 45lbs.; 1cwt. super and 1cwt. carbonate of lime, 20bush. 22lbs. (Secretary: H. Ramm.)

HARTLEY (Average annual rainfall, 15in. to 16in.).

January 16th.—Attendance: 8.

AILMENTS OF CATTLE.—Paper read by Mr. A. Brook:—"*Lumpy Jaw.*—This complaint is characterised by a hard, bony swelling, and usually occurs on the lower jaw; but it may affect the upper jaw below the eye, the glands of the throat, and udder, and the tongue. The swelling usually breaks with a number of small openings, which later join together and form a large one. Pus, tinged with blood and sometimes particles of bone, are discharged. To treat this trouble, clean out the cavity with a clean, blunt knife, removing fragments of diseased bone and tissue, and syringe twice daily with a 2 per cent. aqueous solution of iodine. Also give 2 dram doses of iodide of potassium in the feed twice a day for a fortnight; allow 1 week to elapse, then repeat. *Mammitis.*—This complaint is well-known to all dairymen, and takes the form of an inflammation of the udder, caused by knocks, cold, overstocking with milk, and by a contagious germ. The injured quarter becomes infected through the opening in the teat. Mammitis is characterised by a tense, painful swelling of one or more quarters of the udder; the milk is altered in colour and texture, and is clotted and watery, or pus-like. Treatment consists in stripping out as much milk as possible, and if a teat syphon is used, precautions must be taken to see that it has been carefully sterilised before inserting it into the teat. Make a mixture of ½gall. of warm water and ½ pint of strong vinegar; bathe the udder thoroughly, and subsequently dry it to guard against a chill. Next apply warm antiphlogistine packs to the affected part, which can be held in position by a strip of chaff bag tied over the back. *Bloat.*—This fairly common complaint usually follows feeding on a growing crop of lucerne or other gaseous fodder. The animal becomes blown up on the left side, is generally frightened to walk; the tongue protrudes from the mouth, breathing is difficult, and the animal groans. To afford relief, place a stick in the cow's mouth, and fasten with straps to keep in position. Then give a drench of 1lb. Epsom salts, 1oz. of ginger in 2 bottles of warm water." (Secretary, W. Brook.)

THE WHEAT INDUSTRY.—Mr. C. Brook in the course of a paper dealing with this subject said the quality of Australian wheat that was exported was so low that at present No. 1 Manitoba was bringing in 1s. per bushel more than Australian wheat. He contended that such would not be the case if only good quality wheat were grown and properly cleaned before it was exported. To encourage the growing of these wheats he suggested that the money at present allocated by the Government to encourage crop competitions

should be given to the farmer whose crop consisted of the highest percentage of strong or medium floured wheats. The R.A. & H. Society could also assist in this direction if the grain in the show for seed wheat entries was milled and one point awarded for every unit of gluten. Too many varieties were grown. A reference to the catalogues of the Show Societies would show the types of wheat exhibited; Adelaide, strong 9 varieties, medium 15, weak 46; Melbourne, strong 6, weak 25; Sydney, strong 5, medium 17, weak 48. Roseworthy College for some years passed has used King's White in the breeding plots. It was a weak floured variety and in the Southern districts a poor yielder. Although agricultural authorities stated that the high quality wheats were poor yielders he found that in practice, that was not so. He had had higher returns from the wheats of good gluten content than from Nabawa. Mr. Brook expressed the opinion that Ford was the best wheat that the College had produced. Sword had taken the places recently held by Federation and Gallipoli. He had grown it for 2 years and found that the sample was not so good as that from other wheats growing alongside of it. Further it was rather hard to thrash. His experience went to prove that by selecting the large heads with a good sample of grain from the plants with the greatest number of stools the yield per acre could be increased by 1 to 3 bushels. The recent World's Grain Exhibition held at Regina, gave an excellent indication of the varieties best suited to the English market by placing Comeback 10 times out of 28 sections. Ford made a name for itself by winning third prize. Present indications led one to believe that there would not be any very marked fluctuation in the price of wheat for the next 25 years. France was selling wheat in England for 18s. per quarter (480lbs.) and flour for less than 10s. per sack of 280lbs. as against the home price for flour with an exchange equivalent of 58s. to 68s. per sack of 280lbs. Italy was selling flour in England for 7s. 3d. for a sack of 280lbs. and the home consumption price in that country was 50s. per sack. If Australia could send full cargoes true to type of such wheats as Comeback, Quality, Florence, Ford and others, there would soon be a greater demand and better prices. Mr. Brook considered that bulk handling would not help in this direction, because good and bad wheats would be mixed in the silo and the whole wheat would have to be sold as a bulk sample. His experience of pooling was that he never received less than 2d. per bushel than those farmers whose wheat went into the pool, but one year 1s. 3d. more was received and during another season 1s. 5d. per bushel more. Mr. Brook referred to the effects of the tariff. In conclusion he said that land not suited for the growing of wheat could be utilised for the cultivation of other cereals, pastures, and root crops for live stock.

INMAN VALLEY (Average annual rainfall, 26 to 27in.).

February 21st.—Attendance: 16.

LESSONS FROM 1934.—Mr. C. Davenport read the following paper:—"The past year was an exceptionally good season. Paddocks which had been topdressed showed remarkable growth and only with heavy stocking was it possible to keep the feed from getting ahead of the sheep. If the latter happens, it is just as bad as to allow the paddock to be eaten right out. In the first place foot rot is almost certain to be experienced and the flock master is bound to have trouble with worms. Late autumn is the worst period for the latter pest and it has always been my practice to hand feed from this stage onwards. The treatment of all affected sheep is done in the branding race which is 3ft. wide by 30ft. long with a gate at each end. I have found the tetrachloride drench give the best results. One objection to the copper sulphate drench is the time that it takes to treat a number of sheep. It is best to give 2 doses at about weekly intervals, but to get best results drenching should be done each month. All healthy sheep should be drenched twice a year—during crutching and shearing. The best preventive measure against worms is burning the pastures and fencing off swampy areas. Coupled with these, rotational grazing should be adopted and salt licks provided. Pastures that have been stocked at all heavily should be treated with the pasture harrow. It will help to promote an even growth all over the paddock. Wet weather had precluded the best quality of meadow hay from being made. Cocking the hay with a rake and making a stack in the paddock saves a tremendous amount of time. The middle of August is the best time to shut up the hay paddocks. The cheapest method of killing bracken fern is with the aid of cattle. Get the clover into the land, use adequate dressings of super and the cattle will do the rest. Cutting by hand involves a good deal of labour, but if it has to be done the best time is late summer and early autumn. Kikuyu grass has proved invaluable for planting on the edges of washes and creeks. Yorkshire Fog is another grass which is worthy of more attention. It is the best grass to put down when seeding new land. It will stand up to heavy grazing and grow on very poor soil. The following hint may be useful in treating a sheep with a broken leg; it has proved most successful. Cut strips of brown paper 3in. to 4in. wide, dip the paper in water and roll it up in a similar manner to a linen bandage. Bind the broken leg by unwinding the bandage and tie tightly with string above and below the break. In a few days the paper will become quite stiff and the sheep will require no further attention.

Mr. C. A. Goddard, of the School of Mines, delivered and address, "Preparation of Wool for Market." (Secretary: A. M. Fuller.)

Mr. Norman Brookman, of the Meadows, invited the Mount Compass Branch to hold its Annual Field Day at "Burbrook" on December 6th. There was a large attendance of members and officers of the Department of Agriculture, and in the above photo Mr. Brookman is shown explaining the treatment of one of his pasture paddocks.

The process of baling grass hay was of special interest to visitors at "Burbrook."

LONGWOOD (Average annual rainfall, 37in. to 38in.).

January 19th.—Attendance: 12.

HOMESTEAD MEETING.—The monthly meeting was held at the residence of Mr. J. Roebuck, who has occupied his present holding for 47 years. The property is equipped with an electrically driven pump, which delivers 2,000galls. of water per hour. Eleven sprinklers water 9 acres of vegetables, which at the time of the inspection were very healthy; 160,000 onions from seed raised on the property had been planted out. The orchard contains 2,000 fruit trees, the greater number of them being apples. The latter were carrying a good crop, but quite a lot of the fruit had been hail-marked. An ingenious home-made power spray came in for very favourable comment, as did a red Jonathan that had been worked up by Mr. Roebuck. Other items inspected included the machinery, stock, grafting appliances, and codlin moth bandages. At the evening meeting Mr. H. H. Orchard (R.D.A.) spoke on the coming fruit export season. (Secretary: H. Haines.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Monarto South .	16/2/35	15	"Training a Sheep Dog," E. Frahn	C. Altmann
Yundi	20/2/35	14	Addresses—Messrs. Neilson and Bevan	T. Smart
Cherry Gardens	16/2/35	12	Visit to Willunga and Mount Compass	A. Stone
Blackheath	28/2/35	9	Question Box	E. Paech
Springton	6/3/35	10	Question Box	E. Brokate
Ashbourne	7/3/35	11	Address—C. A. Goddard	H. Pitt
Hartley	13/3/35	11	Discussion	W. Brook
Milang	5/3/35	22	Address—C. A. Goddard	L. Yelland
Frayville	14/3/35	14	Address—S. von Doussa	H. Ramm
Monarto South .	16/3/35	20	Address—" Fencing "—A. Hein	C. Altmann
Yundi	20/3/35	—	Annual Meeting	T. Smart
Inman Valley...	20/3/35	20	Visit to Mount Barker and Tweedvale	A. Fuller
Macclesfield	21/3/35	10	Address—H. Squires	H. Ross

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

CONFERENCE OF MID-NORTH WOMEN'S BRANCHES.

Mrs. E. L. Orchard (Belalie) presided over an excellent attendance of delegates from Mid-North Branches at the Conference which was held at Red Hill on 14th March.

The Hon. H. G. Hawkins, M.L.C., and Mr. H. B. Barlow (Chief Dairy Instructor) explained the regulations of the Dairy Act. Conference discussed the activities of Women's Branches and the following resolution was carried:—"That this Conference desries a broadcast talk once a month on the activities of Women's Branches and on subjects of interest to the members in general. Mrs. H. J. Crouch acted as secretary.

The following papers were read and discussed:—

SUMMER DRINKS.

[Mrs. R. C. Hawke, Belalie.]

If the body is deprived of water, the tissues become dry and shrunken, the blood is thick and circulation sluggish. The body thus requires a certain amount of water to maintain health and life.

The natural drink is water, and its place can only be taken to a limited extent by other beverages. On an average about 3½ pints of water are necessary each day. A certain amount of this is taken in solid food, but the bulk of the day's supply should take the form of beverages.

During hot weather, one usually likes something cold to drink, although a cup of hot tea is always very popular, and beneficial too, if taken properly prepared and in moderate amounts.

To make a good cup of tea, allow 1 teaspoon to every pint of water, and 1 teaspoon over. Heat the teapot, then put in the tea and pour freshly boiled water over the leaves, allow to draw for 3 minutes in a warm place, then pour. If tea stands too long, the

tannin, which is harmful, is extracted from the leaves. Cold weak tea is an excellent thirst quencher. Iced tea is good too, it is made as ordinary tea, poured into cups with the addition of a slice of lemon, ½ cup of crushed ice, and sugar to taste; drink when chilled.

There are numbers of fruit essences sold these days, which besides being economical, are mostly delightful to drink; and if they are served icy, are tempting on a warm afternoon or evening. That something cold to drink can very well become almost a whole meal in itself is not so familiar an idea, yet it is a very practicable and delightful one.

Food beverages, as they may be called, are most appropriate for between meal luncheons, when appetites flag in the summer, and if they are served in interesting glasses, accompanied by a straw or two, they will almost invariably be hailed with delight, and partaken of with gusto. Prepare beforehand a jar of simple sugar syrup which sweetens the beverages much more satisfactorily than does sugar alone, and makes a much smoother, richer produce. 1½ cups of sugar to a quart of water, and boiled for 5 minutes is the recipe.

There are numbers of concentrated fruit extracts in rich flavourings which can be purchased at most grocery stores for a small amount, and these, with the addition of sugar and water, will make about 5 bottles of essence and are always popular, especially with children. A good tip, when oranges and lemons are cheap, is to procure a quantity and extract their pure juice and store it. To do this, a large squeezer is a time saver. The juice should be squeezed through a muslin bag in order not to include pips or pulp, then pour the juice into small bottles (½ pint ones are handy) which must be perfectly dry. Fill almost to the top with juice, but leave enough space for about 2 teaspoons of sweet oil, a little more or less according to the size of the bottles. After putting in the oil, cork the bottles securely, and keep in a cool place. When the juice is required for use, fasten a small piece of cotton wool on to a skewer and dip in, until the oil is absorbed. The juice should be used within two or three days after opening the bottle.

Milk drinks are many and delicious, milk shakes being the simplest form of this group, are easily varied and always nourishing and refreshing. When making cold drinks of any type, a shaker will be found a most convenient utensil, but a quart, or a ½ gallon fruit jar, fitted with a reliable rubber ring and a lid is a good substitute.

Pink milk shake is always a favourite with children. Make it by shaking together ½ cup of crushed ice, 6 tablespoons of strawberry or raspberry essence and 1½ cups of milk. When frothy and light, pour into small glasses and top with a teaspoonful of whipped cream, flavoured with the essence.

Orange Sullabus is an unusual milk drink, and as it is so nutritious and refreshing, it should be better known. Pour ½ cup of orange juice into the shaker, add ½ cup of beverage syrup (that is the sugar and water) and 1 cup of crushed ice, shake until well mixed, then add 2 cups of milk and continue shaking for a minute or two. Fold in ½ cup whipped cream, shake again, then serve frothy and chilly in colourful glasses.

Recipes for a Party Punch Bowl.

Fruit Cup.—A delicious drink at an evening entertainment and looks nicest served in a large punch bowl with slices of fruit and lumps of ice floating on the top. Allow 2 lemons and 4 oranges to each quart of liquid, and add any other fruit juices. One may have the addition of passion fruit juice, and also crushed pineapple gives a nice flavour. Sweeten with sugar dissolved in a little warm water. The fruit juice can be prepared beforehand and left standing in the bowl. Just before it is to be used, fill up with dry ginger ale, lemonade or soda water, and if one wants to make it specially good, add a bottle of cider.

Claret Cup.—Make a syrup of 1½lbs. sugar and 1½ pints water, thinly peeled rind of 4 oranges, and ½ nutmeg, 4 slices of cucumber, strain and allow to cool, add 1 gallon of water, 3 bottles of claret, 1 glass of brandy and orange juice. Just before using, add 4 bottles of ginger ale. This is enough for 60 glasses.

GRAPE-MENT ADE.—Cook together to a thin syrup 1 cup sugar, 2 cups water, add 3 drops of essence of peppermint, cool, and mix with 1 cup of lime or lemon juice, and a quart of grape juice, and serve garnished with thin slices of lemon. To make the grape juice, pick grapes from stems and to every 8lbs. of grapes add 1 pint of water and ¼ cup of sugar, boil for 8 minutes, then strain into sterilized warm bottles and cork tightly.

ICED COFFEE.—A welcome change from fruit drinks, and is stimulating. The coffee essence is simply made by putting 3 tablespoons of coffee (ground) into a saucepan with a cup of water and a pinch of salt. Simmer slowly for 2 minutes, remove from fire and allow to stand for 5 minutes. Strain carefully into another saucepan, add 1 cup of sugar and stir until dissolved, bring to boil and boil for 5 minutes without stirring. Cool, then pour into a jar and keep in a cool place until wanted. Put 4 cups of milk and 2 tablespoons of essence into a large jug and stir well, then chill thoroughly and pour into glasses. A teaspoon of whipped cream on top adds to the appearance and flavour. This recipe is enough for 6 glasses.

GINGER BEER.—Always a favourite. Take 4 cups of sugar, 4 gallons water (cold) 2 teaspoons cream of tartar, 4 teaspoons ground ginger, 3 tablespoons yeast. Mix all well together and bottle.

CIDER.—Makes a wholesome drink—appears to benefit some people who suffer from rheumatism. Here is a recipe for cider cup. 2 bottles of cider, 1 bottle of soda water, peel of a lemon, a few drops of orange bitters. Mix all ingredients together and serve very cold with a little lump of ice in each glass.

An immoderate use of acid liquids, that is, lime juice, lemonade, &c., in hot weather is a bountiful source of dyspepsia. Fruit salts, if taken first thing in the morning, are excellent for one's health during hot weather. This recipe is a good one:—2 ozs. cream of tartar, 2ozs. tartaric acid, 2ozs. bicarb. of soda, 6ozs. castor sugar, foz. Epsom Salts. Rub all through a sieve and mix thoroughly. Bottle and keep in a dry place. Use 1 or 2 teaspoons in a glass of water.

THE USE OF LEMONS.

[MISS L. DESILVER, Nelshaby.]

No garden is complete without a lemon tree, as lemons can be used in a number of ways every day in the home. Lemon trees are very hardy and grow in almost any soil, and with reasonable care, will bear most of the year. They are surface feeders so always use a fork when digging round a tree in order not to disturb the roots. A tree that does not bear should be cinctured. The fruit should always be cut, never pulled, as the stem holds the gas in the fruit. Sulphate of ammonia is a good tonic for a tree, also plenty of rotted stable manure, the more fertilizer used the more water is needed.

I have better results in keeping lemons by using vaseline and storing in a cool place. When a small quantity of juice is needed, puncture with a prong and squeeze out the juice. By placing lemons in a hot oven for a minute or so more juice is procured. Peelings and pips of oranges and lemons contain tonic properties, soak either in cold water overnight, and drink the water before breakfast. Lemons sliced and put in the bath make it very refreshing. Slices of lemon in the copper whiten the clothes. Lemon and salt remove stains from the hands; glycerine and lemon is a good skin whitener. Use lemon in the water when rinsing the hair, also use the juice in cakes, biscuits, &c., instead of essence.

RECIPES.

LEMON JELLY.—First day, cut lemons in slices and to each pound of fruit add a quart of water; leave for 24 hours. Second day, boil 20 minutes and stand 24 hours as before. Third day, boil pulp, strain, and to every cup of syrup, add a cup of sugar, boil until a spoonful placed on a saucer will jell, generally about 30 minutes.

LEMON PEEL.—Soak peel in a brine that will float an egg, next day, boil in clear water until it can be pierced with a straw. Make a syrup of 2 cups sugar, 1 cup water—boil peel in syrup until transparent. For show purposes add 2 more cups of sugar to remaining syrup, dissolve and pour over peel.

LEMON SAUCE.—Half a pint of water, 1 or 2 lemons, according to taste, 1 teaspoon cornflour, dessert spoon butter. Heat water with thinly pared lemon rind, sugar, and butter. Boil 10 minutes, blend cornflour with a litle water, add to other ingredients and boil 5 minutes. Remove peel, add lemon juice and more sugar if desired.

Sugar and water syrup is more economical for lemon squash. Lemon juice is an improvement to milkless tea. Lemon juice bottled, with a film of olive oil added will last for months. Use lemon juice in place of vinegar for beetroot, lettuce salads, &c.

HONEY AND ITS USES.

[MRS. A. SANDERCOCK, Belalie.]

Before sugar came into universal use, honey was commonly used for sweetening purposes. A tablet of sunbaked clay, has been found containing the epitaph of a Babylonian ruler, paying tribute to honey. The Hebrews traded extensively in it, and the Bible contains numerous references to it.

Honey is a substance derived from flowers, but modified and changed by the honey bee. It is a mistake to suppose that bees get ready made honey from the flowers. No flowers contain honey as we know it: honey is specially made by the honey bee from materials derived from flowers. The sugary material produced by flowers is not honey and does not exist to the bee. It is made by the flower for its own purposes; but it serves the flower indirectly, because the visit of the bee is of value in helping to fertilize it. The bee stores honey in a hive with moveable combs which the apiarist now provides. When it has ripened, the bees cover the cells with a cap of wax, which is removed with a hot knife; the honey is then thrown from the cells by being whirled rapidly. Hence the term "extracted" honey.

The finest of this kind is bright and clear, of a light amber colour, as well as delicate in flavour and aroma. Yet other colours also occur, being due to the food of the bees. Moreover, honey may occur in a semi-fluid, in addition to a solid form. The colouring, however, does not affect its eating qualities, while the most popular honey in England—heather honey—is very dark and gelatinous. It commands the highest price. Lucerne-fed honey is almost white, in fact, practically colourless and the flavour is delicious.

Apiaristic honey consists chiefly of levulose and dextrose, the former being the fluid, and the latter the sugary portion. It is this latter that is so largely called upon in the composition of diets. Yet, honey alone requires very little work from the digestive system, being immediately ready to be absorbed into the blood, carrying the necessary vitamins and mineral salts to give energy and health to the human system. The only inorganic element required by the human body not available in honey is silicon, which is supplied by glacial stalks like celery, asparagus and silver beet.

Candied honey is the result of cold weather causing it to set in one large block. It may be liquefied by placing in warm water, care being taken not to over heat, which

often spoils the flavour. Candied honey can be used as a filling for sandwiches, a delicacy much appreciated by school children.

Honey may be used to sweeten porridge; it makes excellent eating with bread, and children like it so, followed by a cup of milk. Delectable biscuits can be made from it according to the following recipe:—

HONEY OAT COOKIES.—4ozs. rolled oats, 6ozs. flour, ½ teaspoon carbonate of soda, ¼ teaspoon ground cinnamon, ground cloves, grated nutmeg and salt, 4ozs. raisins, 1 teacup honey, 3ozs. butter (melted) and 1 egg. Sift the flour with the salt, soda and spices. Add rolled oats and raisins, then honey and melted butter. Mix well so that the last two ingredients may be well worked in. Add the egg well beaten, and stir for 5 minutes. Drop small portions on cold oven slides and bake for 15 minutes. These cookies improve with keeping.

Leading physicians reccommend honey as a pure food, although it is incomplete, inasmuch as it does not contain silicon, an element necessary to build flesh. Dr. Philpots recently advised its use for the prevention of dental decay, in that it contains natural calcium, with which to repair the teeth. Yet it is this that refined sugar takes from the teeth. It is of particular benefit for nervous exhaustion, heart weakness, digestive disorder and general lack of tone. Honey may be used as a demulcent and laxative, but large doses induce flatulence and gripe. Doctors allow diabetic patients to eat honey, whereas they cannot take sugar. Sufferers from gout, dyspepsia or rheumatism also find honey to be the safest kind of sweetening for their food.

Drugs are sometimes administered with it, while it aids gargling, and may be applied to ulcers. Affections of the throat are relieved by its soothing properties, and mixed with lemon juice it forms a cure for coughs. A recipe for this preparation is as follows.—Pour the juice of a lemon over 2 teaspoons of honey and mix well. One teaspoon of brandy in addition is useful as a corrective, and assists in cutting the phlegm.

Even the toilet may benefit from honey. A soap most soothing for tender skins may be made thus:—2lbs. common white or yellow soap cut into thin shavings with enough water in the pan to keep it from burning. When melted add ¼lb. honey and stir until it boils. Add a few drops of perfume and pour into a deep dish to cool.

Mention of honey recalls the fact that many may learn economy from the beehive, and be stimulated to industry by the bee's galvanized energy, rendered necessary by its brief life.

MINOR AILMENTS.

[SISTER HARSLETT, Gladstone.]

Burns and Scalds.—To burns and scalds apply oil of any kind. The best to use is carron oil (so called because first used at the Carron Works). It is one half lime water and one half linseed oil. Picric acid is very good to relieve pain; when the skin is unbroken moisten it and apply cooking soda (carbonate soda). If severely burnt, the patient should be disturbed as little as possible. He is suffering from shock and the pain of having the wounds dressed may so increase the shock as to cause his death. Burns are sterile wounds and can safely wait for 24 hours. If a child's clothes catch on fire, avoid draughts. Do not let the child run outside, but roll him up tightly in a blanket, or a woollen tablecloth. Always send for a doctor, or immediately send him to hospital, for the shock may be very serious. To prevent burns and scalds where fires are open, and there are children, fire guards should be used. Boiling water, &c., must be kept well out of reach of the children.

Strains and Sprains.—For strains and sprains apply either hot foments or cold compresses, and keep the part elevated and at rest.

Bruises.—Bathe alternately with hot and cold water, and then apply hot foments.

Cuts and Wounds.—To stop bleeding from a cut or wound, hold the part *up*, not down, and wrap firmly in a clean dry rag, or bandage. If a wound is not clean, wash it in clean hot boiled water, encourage bleeding, then make it as dry as possible with clean cotton wool, paint with methylated spirits, and tincture of iodine, and bind firmly

with a clean rag. Bad cuts that gape open can be held together by placing across the wound thin strips of adhesive plaster, or strapping. This can be bought in small reels and is very handy to have in the home. Should the wound become septic, a doctor should be consulted. If the accident has occurred in the vicinity of animal manure, or garden soil, a doctor should be consulted for fear of acquiring tetanus.

Fainting.—When a person loses consciousness or faints, place him so that his head is on the level of or lower than his body. Loosen all clothing and sponge the face and hands with very cold water. Turn the head to one side so that the tongue does not fall back and block the throat. If he does not soon recover consciousness, send for a doctor.

Sunstroke.—When a person has been overcome with the heat of the sun's rays, place him on his back in the shade, loosen all clothes, wring cloths out of very cold water and place them on the head. As soon as possible get him to bed, and sponge him all over with very cold water. Send for the doctor and *do not* give brandy.

Nose Bleeding.—When a child's nose bleeds, apply ice or cold water compresses to the back of his neck, raise his head, and keep him very quiet. Gently plug the bleeding nostril. If severe or frequent, take him to a doctor to find out the cause of the nose bleeding.

Apparently Drowned.—When a person is apparently drowned, send for a doctor. Loosen his clothes and clear the mouth of foreign matter. Turn the patient over on his stomach, and press regularly up and down on his back over his lower ribs 15 times a minute for 5 minutes. Then turn the patient on to his back; see that the tongue is not blocking the throat, and perform artificial respiration by raising the arms above the head, then bringing them down with the elbows flexed and pressing on to the chest. Do this 15 times a minute, until he revives, or the doctors pronounces it useless. Afterwards the patient should be removed to bed, and warmth applied by blankets and hot water bags, and body being rubbed with methylated spirits, towards the heart, and then also rubbed with hot dry towels. When consciousness returns, stimulating drinks can be given, such as coffee, brandy, &c.

Poisoning.—In all cases of poisoning send for a doctor. Make the patient vomit by giving a drink consisting of mustard (1 dessertspoon), or salt (1 tablespoon) in a tumbler of water. If an acid or alkali has burnt the throat give oil or raw white of egg, and milk. If phosphorus (as in matches) has been taken, do not give oil, after the emitic give water with Condy's crystals dissolved in it, and then a dose of Epsom salts. If an overdose of opium has been taken, give strong coffee and keep the patient awake. In a case of coal-gas poisoning, get the patient out in the open air, and perform artificial respiration. In a case of carbolic acid, or lysol, give a large dose of Epsom salts, or carbonate soda, followed by brandy or whisky. Put the patient to bed, apply warmth, and demulcent drinks.

Snake Bite.—When a person is snake bitten, send for a doctor, tie a ligature round the limb, between the bite and the heart. Scarify the wound, and rub in Condy's crystals.

Bites of Insects.—To bites of insects apply damp cooking soda or a squeeze of the blue bag, peroxide of hydrogen, Friar's balsam or rub an onion on the spot.

Covered with Ants.—Sometimes a child will play on an anthill, and get covered with ants. Plunge the child into a tub of water, and so drown the ants.

Fish Hook in Finger.—When a fish hook is caught caught in a finger, push the point of the hook on and out. Do not try to withdraw it, or the barbed point will tear out the flesh. When pushed through, cut off the barbed point with wire cutters, and then withdraw the hook, a crochet hook can be treated the same.

Knee Jammed between Palings.—It often happens, when a child climbs on to a chair and leans over the back of it, that his knee becomes caught between the wooden uprights. Get a piece of wood broader than the space between the uprights, put it on the slant in between them, and wedge it so tightly that they separate. This will release the knee.

Foot Jammed.—When a foot is jammed, remove the shoe or boot by unlacing if possible. It may be necessary to cut the shoe. Try to wedge the space wider for the foot to be released.

Pediculosis.—This denotes lice in the hair or on the body. The best preparation is a 5 per cent. solution of heliotropin in vaseline. It has a pleasant odour, resembling vanilla.

Ringworm of the Scalp.—Consult a doctor when possible. If unobtainable, cut all remaining and broken hair as close to the surface of the skin as possible, then clean the area well with ethereal soap. Wait until it is quite dry and then paint with tincture of iodine.

Warts.—Warts can be removed by frequent applications of acetic acid, or dilute nitric acid. Care must be taken not to let the acid touch the surrounding skin.

Sore Eyes.—Never meddle with the eyes. If there is anything wrong, consult a doctor at once. For a squint or any other indication of defective vision, go to a good oculist and have the eyes thoroughly examined.

Common Cold.—For a common cold give an aperient and put the child to bed. If everybody with a cold went to bed, there would be a great reduction in the number who catch cold. Not only does the person thus isolate himself from others, instead of being for weeks a carrier of germs, but also he recovers far more quickly. There would also be far fewer cases of pneumonia. Children are very liable to broncho-pneumonia and this is always very serious. Broncho-pneumonia often follows a cold and infectious diseases such as measles, mumps, and whooping cough. Colds are infectious diseases, most dangerous to babies, who should be carefully protected from infection from relatives, friends, visitors, overcrowded rooms, pictures, &c.

Sore Throat.—Nurse the child with a sore throat in bed. A simple remedy is a mixture consisting of equal parts of honey and vinegar. Always ask a doctor to examine it thoroughly. There is always the possibility of diphtheria and early treatment is most necessary for this disease.

Croup.—Laryngitis or larygeal spasm causes the child to breathe with difficulty, making a peculiar noise in doing so. Apply hot flannels to the throat. If not soon relieved, send for the doctor, for it may be due to diphtheria of the larynx, which needs urgent treatment.

Scabby Sores.—Scabby sores are very prevalent among school children. Each sore begins as an inflamed blister, containing yellow fluid, which later becomes dry, forming a crust. All crusts or scabs must be removed, and the sore kept clean. The scabs can be removed by applying a little boiled starch or starch poultice, which is made as follows:—Take 4 tablespoons of starch and 1 teaspoon of boracic acid powder, and sufficient cold water to melt the starch. Pour on ½ pint of boiling water, stirring all the time until starch is dissolved. Leave until cool, then apply to scabs. When the scabs are removed an ointment consisting of equal parts of white precipitate, and zinc oxide ointments may be applied. These sores are very contagious. They must always be kept covered, and if on the face and hands the child should not be allowed to attend school.

LOWER NORTH, BLYTH, 28th MARCH, 1935.

Mrs. Dux of the Clare Branch presided over the special session for women which was held at the Blyth Conference. Delegates were present from Sheoak Log, Clare, Auburn, Saddleworth and Wasleys. It was decided to ask that the Department of Agriculture should institute wireless lectures on items of special interest to women. Miss Campbell, of the Education Department, addressed members on the uses of pectin. The following papers were read:—

POULTRY FARMING.

[Mrs. V. A. Bowden, Sheoak Log.]

The culture of the domestic fowl has always had a great fascination for mankind. Years ago poultry keepers were more concerned about the beauty of their birds than egg production, but of recent years the latter has become a valuable industry in a number of countries, and has made rapid progress in every direction.

The first thing is to examine one's own qualifications, and consider if you are the right kind of person to adapt yourself to this kind of work. It is very important that you be fond of fowls, willing to work long hours and it cannot be too strongly emphasized to beginners to "hasten slowly." Start in a small way and increase your flock as experience is gained, as in other things you learn by your mistakes.

Choose the breed on which you intend to concentrate. For egg production alone, the White Leghorn is very popular. For egg and table purposes, the Black Orpington is suitable. For table purposes alone the Light Sussex is one of the best. Two other foremost breeds are the Black Minorca and the Rhode Island Red.

There are several recognised ways of making a start; purchasing breeding eggs, day-old chicks, pullets or breeding hens, but it is essential to success that the very best be purchased from reliable breeders. It is far better to pay a good price at the outset, than to find later that the birds are worthless.

Years ago poultry was kept in a very haphazard way, with all ages, breeds and sexes running together, but research work has proved that fowls should be properly housed, bred and fed for results. Houses should face north or east, and in this country preferably be made of iron. Every fowl should have 4 square feet of floor, and the shed should be high enough for the attendant to walk under at the back, and slope upwards towards the front, the roof extending out about 2 feet is high enough. Some sheds are built with dropping boards, and scratching litter all over the floor, but they do not allow air to circulate freely and are condemned by some on that account. Other sheds have perches at the back, and the rest of the shed partitioned off for the litter. It is also important to have suitable drinking vessels, and an adequate number of nests, which should contain shell grit. If possible build on sandy soil.

Hatching.

Hatch at the right period of the year, for heavy breeds July, August and early September; for light breeds, August, September and early October are the recognised months. Some poultry farmers rear in early autumn and others are very much against it. As a rule, autumn hatched chickens do not grow so big as the spring ones, and if one rears in the two seasons, it is impossible to spell the chick rearing sheds and runs.

The old practice of hatching with hens, is strongly condemned by all successful poultrymen. The incubator is less work and more profitable in every way. Incubators are extremely simple to operate, there being two main types, the hot air and the hot water. No hard and fast rule can be set, as the makes vary a little in operation. Before placing in the eggs see that the machine is properly regulated to obtain an even heat of 103° for about 24 hours with the thermometer on a level with the eggs. When the eggs are put in the temperature will drop considerably, but will rise again to 103° if correctly regulated. This heat should be maintained until towards the end of the period, when a shade hotter often gives better results. Some use water in the trays only the last week, others believe in it right through the hatch, and oft-times use sponges and damp the floor, &c., as well, to obtain more moisture.

The eggs should be kept turned at least twice a day until the 19th day, when the door is kept closed until the 22nd day, then all the chicks should be fit to be removed to the brooder. On the 17th day it is the usual custom to scrub the water trays and fill with clean water. The thermometer should be hung in line with the eggs. The room in which the incubator is installed should be well ventilated but free from draughs. It is also very necessary to use judgment when selecting eggs for incubation, and it is absolutely essential that all eggs be over 2ozs. in weight, and fresh. Whilst keeping for incubation, they should be turned every day and kept covered to save evaporation. Never incubate eggs that are opaque, have large pores or bands or any that have blood spots, &c. It is very wise to candle them first.

CARE OF CHICKS.

On taking chicks from the incubator the brooder should be ready to receive them. It is a bad practice to put the chickens with broody hens, which is a common habit on a number of wheat farms. There are various makes of brooders, and anyone only wishing to rear a few chicks can do so by use of flannel boxes. Some poultry farmers advocate the colony system, with a brooder house of two or three rooms, each containing a suitable brooder. At first it is necessary to supply artificial warmth by means of a heat brooder, then later by flannel brooders. The time in each generally depends on weather conditions and the time of the year. On leaving the brooder house, they are transferred to colony houses, usually with free range, or grass runs.

Do not feed the chickens for the first 24 hours, give only clean water and fine sand, then a majority of poultry farmers use No.1 chick grain. About the fourth day, give the chicks greens, lettuce or silver beet for preference. Some give chicks dry mash, and others wet mash, but they must be provided with the proper nutriments to build the bone structure. Grains and mashes are not sufficient, it is very important that they have milk in some form with plenty of greens. Bonemeal and charcoal are beneficial. Most people on wheat farms have plenty of separated milk, and this cannot be utilised in a better manner than to feed it to your chickens.

The following is the Parafield mash formula for chicks:—

	Chicks to 3 weeks.	3 to 6 weeks.	6 to 12 weeks.
Bran	3 parts	2 parts	1 part
Pollard	1 part	1 part	1 part
Buttermilk powder	5 per cent.	5 per cent.	5 per cent.
Bone meal	5 per cent.	5 per cent.	
Charcoal	5 per cent.		

Greenfeed, shell grit, charcoal and Epsom salts from 12 weeks onwards. Besides the mash the chickens require various cracked grains.

It is only within the last few years that the question of growing rations has received serious attention, but it is a mistake to force chicks, therefore it is not advisable to feed high protein rations, because instead of adult fowls of good size, they will grow into stunted culls. It is also necessary that chickens have plenty of sunlight, failing this, it is then advisable to feed Cod Liver Oil, the amount varies, but about 2 per cent. is the general rule.

CHICK DISEASES.

The dreaded diseases with young chicks are White Diarrhoea and Coccidiosis. The symptoms of White Diarrhoea are chalky pasted deposits below the vent and later severe diarrhoea, generally weak looking condition and drooping wings. The germs of this disease may be transmitted from parent to offspring through the egg. To prevent this trouble, feed plenty of milk, preferably sour.

In Coccidiosis the chicks feathers become ruffled, and they stand around with drooping wings, the droppings are of brick red or salmon colour, liver congested. If some of the chickens are opened, it will be observed that the blind pouches are filled with blood or cheesy matter. It is a common belief that minute parasites burrow into the intestinal walls and cause haemorrhages; this trouble generally occurs when the chicks are about a month old. Strict cleanliness is a prime factor in abating the disease, and again sour milk is looked upon as a corrective. Other troubles to be guarded against are Rickets or Leg Weakness. Mineral Deficiency, and Cannibalism.

Young roosters should be separated as early as possible and when the pullets are nearing production—about 5 months—this varies according to breed and time of hatching—the heavy breeds take longer to mature than the light ones—they should be put into the laying sheds. Strict culling is now essential, and success in this industry lies here, as it is very important to be able to pick the layers and market the culls.

Feeding.

A number of poultry farmers prefer to continue feeding the growing mash a while longer, gradually working in the laying one, as care must be exercised to prevent the pullets from going into a false moult. There are quite a number of formulas for laying hens, but all are divided into two sections, dry mash feeding and the other wet With dry feeding there is an undoubted saving of time, this being fed in large hoppers, often holding several days' supply of food the birds having free access to it all the day or any portion of the day that is thought necessary. In wet mash feeding, it is claimed that the birds lay considerably better and that returns in consequence are higher. As an offset against this, however, the fact has to be borne in mind that fewer hens can be attended than the case where dry mash is employed.

The following is the Parafield Laying Mash:—Bran 1 part, pollard 2 parts, and 10 per cent. of either butter milk powder or meat meal, but not both. Greenfeed is fed at the rate of 40 to 62 per cent. according to season. Shell grit and charcoal are always available in the hoppers, and Epsom salts, 1oz. to 20 birds once a week. In mixing wet mash it should be of a crumbly nature, care should be taken not to mix it too wet, as this causes diarrhoea. The usual practice is to scald the meat meal with sufficient liquid and add to the bran, then add 40 per cent. of chaffed greenfeed, and dry off with the pollard. Some poultrymen believe in using about 1 per cent. of common salt; special care must be exercised in order that it is free from lumps, or the birds are apt to get salt poisoning. Sulphur is often added to the mash at the rate of ¼lb. to 100 birds fed once a week.

The mash is the recognised morning food, and wheat in the evening, 2ozs. per bird is the required quantity. Some believe in feeding a portion of this amount at noon, together with chaffed greenfeed. It is very essential that the same system must always be employed, together with regular hours of feeding. Barley and silver beet are excellent winter greens, and undoubtedly lucerne stands on its own for the summer months. Should any hens become broody during the year or ill, ring their legs in order to exclude them from the breeding pens. In this way broodiness can be eliminated entirely from the flock, and to breed from a hen that has been ill (however good a layer) is courting disaster.

Picking the Layers.

To be successful one must have the ability to pick the layers; seek the alert, active kind, and one that is a good worker, who scatters the litter vigorously. The eyes are very important, they must be bold, bright and good sight in both; the comb should be medium in size and of fine texture, wattles and ear lobes thin and smooth. The head should be long and fenimine, with an inclination to be lean and narrow and neck fairly long. The back of the hen should be long, with broad shoulders, and a good oil valve. The pelvic bones to be fine, short and not too far apart, the breast bone thin and straight, and the skin of fine texture, with the feathers lying flat on the bird; this is known as "tightness of feather." The legs fairly long, wide apart and covered with tight fitting scales, feet with toes well spread, long and thin with curved short nails.

It is very vital in these days of low prices, to breed birds of productive qualities and in order to ascertain this, it is necessary to single test or trap nest, and the pullets treated in this way should lay at least 220 eggs in a year. These birds are then mated with a rooster, whose pedigree is already known. A great deal of importance is now attached to the ancestry of the male, as it has been shown that a hen transmits her laying qualities to her sons, who in their turn pass the same capabilities to their daughters. While high scores are essential, the general health and stamina must not be lost. Like produces like, therefore, never breed from any who are physically unfit, undersized, or any noticeable defect or broodiness.

The cockerels thus reared are mated when a year old to the hens (after being strictly culled) that have been in the laying sheds for the past year. Two years is the recognised period to keep hens for profit, occasionally those of extra good performance are kept a third year for breeding purposes.

Some believe in giving their breeding fowls free range, as they consider the chicks are stronger and eggs more fertile. The number of cockerels required varies according to breed and condition, heavy breeds requiring more than light ones. Others have small breeding pens with about 7 or 8 hens to 1 cockerel in light breeds and 5 or 6 in heavy ones. Less roosters are required when hens are on free range.

In these days of over production, we are compelled to look further than Australia for a market for surplus eggs, and all countries have eyes on Britain in this respect. For our own benefit as well as the State in general, we should only market the very best article, care in breeding to obtain only eggs of 2ozs. and over, small eggs are a menace to the industry. Eggs should be gathered 3 times daily, and kept in as cool a place as possible, marketed twice weekly during summer and once a week in winter. All eggs should be spotlessly clean, and only breeding eggs to be kept fertile, because the keeping qualities of the fertile egg are poor, and it soon deteriorates, and even when new laid is occasionally unfit for human consumption. The difference between the price of the export standard and the pulping class is so great, that it more than warrants the extra care in producing the right article.

DISEASES AND PARASITES.

It is also necessary to have a knowledge of the disease and pests one has to contend with; in the case of disease the axe is usually the best way out of the trouble.

Roup is undoubtedly one of the most common of fowl diseases. The beginning of this complaint is a cold with some fever, thin and watery discharge makes its appearance from the nasal openings, which in a few days becomes thickened, obstructing the breathing. Inflamation sets in, extending to the eyes. The eyelids swell and close, and may become stuck together; bathe with bluestone or blue bag. In severe cases the birds are a picture of dejection, practically all the head terribly swollen, the eyes contain a cheese-like matter. Some birds die within a week, others may have a chronic form and live for months; the axe is indispensable for birds in this state. However, in the early symptoms of this disease a cure may be effected; some prefer blue stone, 3ozs. to 2 gallons of water, dose, 1 cup to 1 gallon. Some recommend red oxide; dose, 1 teaspoon, permanganate of potash, oil, kerosene, eucalyptus and quite a number of chemicals are often advised. There are a number of forms of this disease. Diphtheritic Roup, Canker, Catarrh, &c.

Chicken Pox is also another fairly common complaint, the symptoms are sores over the comb and wattles, or black patches; bathe in iodine. This is really a blood complaint, and Epsom salts and sulphur are well known blood purifiers, some authorities say mosquitoes are the cause of this trouble.

Egg bound: Castor Oil should be administered at once, should this prove ineffective, steam vent over boiling water to which a few drops of Tincture of Iodine is added. If by any chance the egg should become broken in the oviduct, special care must be exercised to remove all the shell, or otherwise the pieces may cause considerable damage.

Ptomaine Poisoning is also met with when proper feeding is not adhered to. It is usually caused by eating soiled or decayed foods, unburied animals or dead fowls left lying about. The sudden appearance of several birds with paralysis of the neck, head hanging limp is a sure sign. This condition is so rapidly fatal that little can be done for the affected birds, 2 teaspoons Castor Oil or 1 of Epsom salts may be administered.

Diarrhoea is also fairly common, though not contagious. It has a serious effect on the laying flock; withhold feed for 24 hours, then dissolve 1lb. Epsom salts in water and add to the mash for 100 birds is recommended.

Protrusion is another common trouble, generally caused through an over fat condition of the hen. Death is quite often caused by other hens picking the affected one. If noticed in time and isolated, it quite often recovers, but generally has a white discharge from then onwards.

There are quite a number of other diseases found at times, but cleanliness is a wonderful preventive; all sick fowls should be isolated as soon as noticed; if they do not respond to treatment, kill or burn or bury deep. Always clean up sheds and yards and thoroughly disinfect after any outbreak.

The poultry farmer has also to contend with a number of parasites, tick being perhaps the most undesirable. These pests hide in crevices and cracks of the perches and houses during the day and visit the birds at night. They are found from the small 6-legged larva up to the adult tick with 8 legs, oval in shape with no eyes. Ticks are very tenacious of life, and have been known to live for years without being on any birds. These creatures are responsible for the disease known as "Tick Fever." Burn everything possible that is infested, a blow lamp helps considerably in abating these parasites. Waste crank case oil to paint all perches and woodwork, &c., is very beneficial, as keeping the tick in check is the only alternative.

Worms are another source of annoyance; the three main types are Round Worms, Tape Worms and Cecal Worms. The adult Round Worm is round in shape as the name implies, yellowish-white in colour, about 1 to 3 inches long. Tape Worms are flat, ribbon-like and segmented, they attach themselves to the intestines by means of little hooks on their heads. Cecal Worms are round and small—¼ to ½ inch long and are to be found in the blind pouches of the fowl. For single treatment Nema Worm Capsules are very effective; for flock treatment some recommend turpentine, others various worm remedies on the market.

The Red Mite is another blood sucker, its only food being the blood of the birds. They are not very hard to kill, but are hard to find; spray with kerosene emulsion.

The Scaly Leg Mite is only 1/100th of an inch long, and lives under the scales of the legs and feet. Sulphur and fat, or kerosene and fat should be applied and if repeated in a week, should effect a gradual cure.

Unlike Red Mite or Tick, Lice live permanently on their hosts. Occasionally they may be seen on the roosts, &c., but die in a few days for want of warmth and nourishment, if they do not return to the fowl. All fowls should be supplied with a dust bath; individual fowls can be dusted with insect powder. In the case of head lice, rub the affected birds with Castor oil or vaseline.

There are numerous other trials the poultryman has to contend with and with the low price of eggs, it will be realised that to be successful, one must be alive to every phase of the industry, careful in every detail, and adopt as many labour-saving devices as possible.

HOUSEHOLD HINTS.

[MRS. MCKENDRICK, Clare.]

The following hint will save many tedious minutes in apple paring:—When preparing apples for cooking instead of cutting the peel with a knife, pour boiling water over the apples and stand for a few minutes. The peel will then come away as thin as paper. To crack hard-shelled nuts, put them in a dish and place in a hot oven for 5 minutes. In this way the moisture is extracted from the shells, making them brittle and very easy to crack. A quick and agreeable way to clean sponges is to squeeze them in water to which has been added the juice of a lemon. A pinch of salt added to mustard will keep it fresh for several days. Mixing it with milk instead of water is a very great improvement. To remove grass stains from tennis flannels, &c., which should be done before the flannels are washed, apply a solution of equal parts of glycerine and yolk of egg. Allow to remain on the stain for 1 hour then wash in the usual way. To give glassware or crystal a brilliant polish, add a little ammonia to the water in which it is washed.

Coffee stains can be removed by soaking in glycerine. Allow to soak for several hours, then wash in lukewarm water. A small piece of butter added to the water in which vegetables are to be cooked will prevent them from boiling over. To restore discoloured

brown shoes, paint with iodine, let them dry overnight, and then polish in the usual way. Scorch marks on white silk may be removed by covering them with a little peroxide of hydrogen, then pressing with a warm iron. When sewing on hooks and eyes or press fasteners, sew on the hooks or press parts first, then rub them with soft chalk and press this to the side to which the eyes are to be sewn. The mark left will be a sure guide Fly smears on windows should be rubbed over with a little washing blue.

To remove grease stains from wicker furniture rub with a cloth dipped in methylated spirits. Flower vases that are discoloured at the bottom can be made clean and sparkling by placing a mixture of vinegar and salt in them for a time. Thin slices of cork glued firmly to the edges of chairs will prevent many scratches on the floor, and save unnecessary noise. When using fresh cream as a filling for sponges, dissolve a teaspoon of gelatine in a little warm water, beat it in with the cream and allow to set for 1 hour.

Soap rubbed along the edges of an obstinate drawer will make it run smoothly. To refresh navy-blue material, use equal parts of methylated spirits and ammonia. The mixture should be rubbed in with a piece of material of the same colour. Ink stains can be removed from linen if they are dipped in pure melted tallow, then washed in the ordinary way. The ink washes out with the tallow. Bottom crusts of fruit pies will not become sodden with juice if after lining the dish with pastry, it is brushed over with beaten white of egg. Darn stockings on the cross, instead of up and down, and the darn will wear much longer. Try a new flavour in cakes by blending lemon and almond essences. A very nice flavour is made of equal parts of vanilla and lemon essences. If it is necessary to use a sewing machine needle which has become blunt, place a sheet of medium grade sandpaper, rough side uppermost under the guide, and run the needle through it once or twice. This sharpens the needle considerably. Old gramophone needles are useful for keeping the back of pictures in place. To prevent sausages bursting, roll in flour before frying. Lamp wicks soaked in vinegar a short time before being used for the first time will give a much better light. To invisibly mend torn cotton window blinds, take a piece of the same material, dip it in hot starch, then place over the tear and press with a hot iron.

To prevent any sauces, milk, &c., from boiling over, lightly smear round the inside of the saucepan with butter. If a little vinegar is added to the final rinsing water when washing any silk articles, it will help to make them last much longer. The vinegar removes every trace of soap, which is apt to make silk rot. Instead of washing a nutmeg grater after using it, put it in a cool oven for a while, then brush lightly. This is a good hint to remember after grating lemons and oranges. Needles will not rust if they are put in a piece of chamois leather, instead of flannel. If the blades of the mincer have become blunt, sharpen them in the following easy manner:—Place several small pieces of bathbrick inside and turn the handle a few times. This will re-sharpen the knives and the bathbrick dust can easily be washed away with hot water. New calico or lace curtains should be soaked in warm water to which 2 handsful of salt have been added. To lift clothes from the copper make a few cuts with a saw around the end of the copper-stick; this will make the stick grip the clothes betted. Tomato juice removes fresh ink stains from carpets like magic. As soon as the ink is spilt cut a ripe tomato in half, rub the stain thoroughly, then wash over with a clean cloth, wrung out of warm water; repeat the process for an old stain until ink is removed. A quick way to preserve new-laid eggs is to rub them over lightly with good butter, store in usual way. Eggs preserved in this way are good for 12 months. Eggs beat up very quickly if a drop of cold water is added to them before you start beating.

It is possible to remove iodine stains from any washable fabric by soaking them in a solution of ammonia and water. Wash finally in warm soapy wter. For a successful baked custard, warm milk before adding the eggs and butter. A length of flexible rubber hose-piping makes an excellent carpet-beater, which is much better than the cane type as it does not damage the carpet. When storing dry materials, such as coffee, tea,

rice, &c., in glass jars, paste the name labels on the inside of the jars. They will not become soiled. When replacing elastic or ribbon in clothes, do not pull out the old elastic before inserting the new. Instead sew the new elastic to one end of the old, then draw out the latter by its other end, and so pull the new piece into place. If the edges of a carpet are beginning to wear, get some wool the same colour as some part of the carpet and buttonhole stitch the worn edges. A teaspoon of glycerine added to 1lb. of flour in bread and cake making, is a great improvement. Not only will the dough be better, but the bread or cake will keep fresh much longer. To keep cheese from going mouldy, rub the cut part with butter, then wrap in white paper.

Stockings that are marked with grease should be soaked in olive oil overnight, and washed the next morning in the usual way. A cork that is stuck in a bottle of polish can be easily removed if it is moistened with a few drops of oil. Glycerine will remove tea-

stains from fine tea-cloths. A quick way to remove bloodstains from articles which cannot be boiled is to make a paste of mustard and spread over the stains; then wash in warm soapy water. If a little butter is added to blanc mange, it will have a richer flavour, and an attractive gloss, when turned out. It is a good plan to wrap a piece of wool round the neck of bottles containing iodine, oil, or any similar liquid. It catches the drops and prevents stained tables and clothes. Always add a few grains of rice when making a baked custard, and it will not go watery. Next time cutting sandwiches, do not throw away the crusts. Sprinkle a little salt over them and toast in a quick oven. They are delicious served with soup.

THE FLOWER GARDEN.

[Miss V. E. Currie, Wasleys.]

In a flower garden one can spend spare time to advantage, and in course of time will bring much pleasure, and a return of flowers which will repay for work done. Practically every home can have a garden where a supply of water is available, and with very little expense the most humble home may be beautified by a garden, however small it may be.

The Lay Out.

First draw a plan of the garden that will make an appropriate setting to the front of the home, taking into consideration the amount of time at your disposal for the working of it, &c., and arrange the size of flower beds accordingly. Lawns may take up quite a large area, and will also add to the appearance. The Mail lawn needs much more attention than the Buffalo grass, though when kept well trimmed makes a very fine one, and one that is green all the year. A palm can be planted in the centre, if so desired, and for this purpose I suggest *Chamaeropes humilis*. It is of dwarf habit, not growing more than 5ft. to 6ft. in height, is of a bushy nature, and ideal for the small garden. Not only lay out the garden for small flower beds and lawns, but leave a space on one side for the planting of a few shrubs, and along with these can be planted a mixture of perennials as well as annuals. Border each bed with jarrah edging 1in. thick by 4ins. deep. Around the lawn it is advisable to have it 6ins. deep. With shallow edging the grass is likely to go under it and come up either in the flower beds or the paths.

Choose a suitable hedge for the front; it will not only enhance the appearance, but shelter the growing plants from all weather. Coprosma makes an excellent hedge for a small garden; it has bright green shining foliage, is almost dust proof, and always looks clean and bright. This hedge is very healthy, rarely dies out, and requires very little water. Plants should be staked, and allowed to grow at the top until they reach the desired height, but should be constantly clipped at the sides. The clipping assists them in making upward growth.

A few roses must be included. Plant one in the centre of each of the small beds intended for the annuals. June and July are generally the best months for planting roses; they are then at their most dormant stage, but planting can be carried on until the end of August. They thrive best in open spaces where they receive plenty of sunshine. Plants grown in shady and sheltered positions are liable to mildew and black spot. Pruning should be completed during July; if pruned too early the new growth will start and is likely to be damaged by frosts. April and May are the best months for planting shrubs, before the cold weather sets in.

Flowering Shrubs.

These are some of the most satisfactory plants grown in a garden. They give a dignity to it, and once established are very little trouble, and do not require much water. Many of them produce very beautiful flowers, and, if a careful selection is made, can be had in flower all the year round. The deciduous varieties are the most beautiful. One is the *Weigela rosea*; it is one of the most beautiful of the spring flowering shrubs, covering its branches with clusters of pale pink tubular-shaped flowers. It should be

planted in a well-sheltered position on the plains. Another is the Guelder Rose or Snow Ball Bush. This is a very handsome shrub worthy of a place in any garden, although seldom seen. When in flower the bush is covered with great balls of snow-white blooms, and makes a fine sight. All shrubs should be pruned immediately after flowering; one cannot go wrong if this practice is followed with all varieties. Most shrubs can be pruned to regulate the growth to a certain extent.

The Blue Iris Stylosa has become one of the most popular winter flowers, flowering as it does when other flowers are scarce. During April and May the long leaves should be cut back to within a couple of inches above the crown, and then given a dressing of lime to kill the slugs and snails, which are very fond of the flowers. Follow this by a watering, and this treatment will result in a wealth of bloom that make a pretty garden show. If wanted for decorating purposes, pick the blooms in the pencil stage and they will last much longer.

In April prepare beds for spring flowering annuals, and clear away summer growths. The beds should then be limed and roughly dug and sprinkled liberally with lime again. They should be left for a fortnight to be sweetened by the sun and air. This exposure of the soil in a roughly broken-up condition is most important, and without it one cannot expect good results. The use of lime can be overdone unless it be accompanied by liberal manuring. For average conditions, lime every other year. After a fortnight has elapsed water well and dig several times until the soil is broken to a nice even tilth. Then give a liberal dressing of stable manure, fork in lightly, rake evenly, and remove all lumps. The beds are then ready for the planting of young seedlings, which have been previously raised in pans or boxes.

More satisfaction is obtained in raising your own plants than buying them from the nursery. It is advantageous to be able to transplant them quickly from the seed-boxes to where they are to be grown, especially during summer, when great precaution needs to be taken only to transplant when a cool change springs up or even a dull day. After planting, water well, not overhead with a hose, but fill a bucket with water and with a dipper or watering-can pour gently around each plant. During the growing period keep the soil well cultivated. Keeping the surface loosened will encourage rapid growth. As the plants come into bloom, give them a little weak liquid manure once a week. Neutral Sulphate of Ammonia makes an excellent stimulant for this purpose, using a level teaspoon to 1gall. of water. Do not exceed this strength, and do not use it more frequently than once a week. The flowers will be much larger and of a brighter, richer colour than if it were not used. Make sure the ground is moist before applying liquid manure of any kind.

Where patches of clover exist in lawns, rub Sulphate of Ammonia well into them. It must be used in a dry state and allowed to remain dry for a few hours. It will cause the clover to turn black, and although the grass will have a scorched appearance, it will come through again without any difficulty. The clover will not reappear.

In a small garden it is easier to plant and to plan out the garden if the plants are massed. In doing this the effect will be far better than any mixed lot of flowers. Plant the mixed varieties in the border with a few shrubs. It is not suggested that in all cases only one variety should be grown in a bed, for some of the best results are secured when good contrasts of colour are effected. For example, I have planted beds of Rosy Morn Petunias edged with Blue Ageratum. These make a most brilliant show that lasted for months. I also have planted beds of Iceland Poppies and Papilio Blue Violas, and there are many other varieties that could be planted likewise.

Ranunculi and Anemones should not be overlooked, for these make a good show when planted in masses, especially Anemones, for their brilliant colouring places them in the front rank of bulbous and tuberous plants for massing, and one may obtain dozens of flowers from a single plant.

Raising Seedlings.

This is the cheapest way when a large number are wanted, and I have had good results by sowing the seed in January or February; then the plants will make a good deal of growth during the warm months of autumn and bloom early in spring. *Primula*

Malacoides is another favourite spring flower, and is very easily grown. Princess Mary was classed the best a few years ago, but now Giant Rose has proved itself to be the best variety of Malacoides yet grown.

At the end of September or beginning of October it is time to sow seed for the raising of summer annuals. Generally speaking, summer annuals are very much easier to raise from seed than many spring flowering varieties. The weather is mild and warm and seeds germinate well and quickly. Sow in shallow pans and cover seed with a light sandy loam with a little manure sprinkled on top. This will help to keep the surface from drying too quickly. The best method for watering is to place the pans of seed in a larger one, containing 3ins. to 4ins. of water, and allow them to stand until the dampness comes to the surface. There is no fear of washing fine seed, such as Petunias, etc., away. The earth will hold the moisture longer, and results will amply repay for the trouble.

During summer, hot and squally weather can be expected, so that one must consider those plants best adapted to such conditions and choose accordingly. Keep to heat-resisting plants such as Petunia, Phlox, Ageratum, Zinnia, &c. Get summer seedlings planted during the first or second week in December if possible. After planting, water well, and cover surface with a thick mulch of either stable manure or straw. It will then be only necessary to water once a week, and plants will stand up to the hottest days under such conditions. There are so many beautiful summer annuals to choose from that it should not be difficult to make the garden gay during that period. Zinnia Linaris is ideal for growing as a border to a mixed flower bed, and looks well in masses. It is a dwarf grower, having small narrow leaves. The plants cover themselves with tiny single deep orange flowers similar to small French Marigolds. The plants flower for months, and one never notices the withered blooms. *Amaranthus tricolour* grown in a mixed border makes a gorgeous show with its striking foliage in green, yellow, and crimson shades. The Miniature Sunflower is another favourite for the border, and will provide a wealth of blooms for cutting as well as a fine garden show. Zinnias are hardy, and make a brilliant show. The giant strain is particularly fine, having very large flowers. When about 6ins. high nip out the centre of plants to encourage them to branch out. This also applies to Phlox and Petunias. These should be grown in masses to get best effects. Asters are a much admired annual for their richness of colouring, beauty of form, and profusion of bloom. The Giant Crego is the finest type to be had, and looks best when grown in mixed colours. They do best in rich, deep light soil, and are much benefited by mulching with manure.

One of the prettiest ornamental grasses is the *Tricholona rosea,* that covers itself with fluffy copper-pink seedheads. It is excellent for mixing with floral decorations. November is the month for sowing the seed.

HOME DRESSMAKING.

[Mrs. M. Perry, Wasleys.]

The advantages of being your own dressmaker are that you can choose the material and just the way you want to have it made, whereas, if you buy a frock you more often than not have to take what fits you, regardless of colour and style, or otherwise you have to make it fit you after you have bought it.

The first and most important part in home dressmaking is to choose styles that will suit the figure and one that will be becoming in the material.

Very tall people should never wear stripes, they are inclined to make you look taller and if choosing a floral material for a stout figure choose a small design on a background, they are inclined to make the figure appear slimmer. Always pick a style suitable for the material you intend having. For instance, a sports style made up in an expensive material looks out of place anywhere. When choosing material for a new frock think what colour handbag and shoes you have so you will have something to tone in with them, it is too severe a contrast to have accessories not toning with the frock.

If a subscriber to any of the journals, you would very seldom have to buy a pattern, for with every journal there are free patterns given and they are always in very pleasing styles. These patterns are given in 36 inch bust measurement which is too big for most women, but are quite easily broken down to fit a small person.

When cutting out a frock from a pattern, always place it against the figure first, because even if you have obtained a pattern just the size—as they are obtainable from 32 to 40 inch bust measurement—it may not be long enough in the waist or some other detail may be wrong. The sleeves for instance, if too long or not long enough should be shortened or lengthened above or below the elbow whichever may be necessary, this keeps the elbow in place. To lengthen or shorten a skirt it should always be done below the hips.

After cutting out the frock, pin the pattern to fit it, if tacked, it may have to be done several times before getting it right. It is always wise to tack before machining as some materials will stretch. Neatness is one of the main things in dressmaking, if everything is finished off neatly, mainly the trimming, the frock will not look home made.

The best way to do kilting is to tack the little pleats first, then press over a damp cloth with a very hot iron. Frills look best cut on the bias and look very nice with edges hemstitched. I make the frills the length I require and half again; at that fullness they fall very nicely. Ruching looks best box-pleated, although it can be gathered. Soft thin material can be stitched without difficulty on the machine if a strip of paper is put underneath it to keep it firm.

THE ART OF ENTERTAINING.

[Miss J. Siebert, Wasleys.]

The first thing to consider is the type of folk to be invited. If old folk as well as young are asked, you must supply some form of amusement for them, therefore, have a couple of packs of playing cards on hand. Also see that you have enough games, musical items, and competitions arranged to keep the guests entertained. Choose an M.C. who is of a very lively nature. It is his duty to take over the responsibilities of the programme which must be prepared neatly beforehand.

If an evening party, see that the flowers are in harmony with any other form of decorations. The decorative scheme always shows up to advantage under artificial light, and is nearly always first commented on. An afternoon party calls for deeper shaded flowers than does an evening; choose flowers that do not wilt.

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	..

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

Make the guests acquainted, and as each guest enters give him or her a tiny slip of paper on which the words cork, knife, fork, bottle, &c., are written. The person with cork will try and find the one holding bottle, and knife will seek fork and so on. After the partners are all found put on a game in which partners share. If competitions are started, have enough papers and pencils to go round.

Now comes the question of dress. If the party be a home one, do not choose evening dress; a light summery voile, chiffon or georgette with short sleeves looks nicest.

If there are toasts to be honoured, have a variety of drinks. A very popular fruit cocktail is made from shreds of grapefruit, juice from the fruit, and lemon juice and sugar, mixed well and iced.

Then there is the question of cigarettes. If your party consists of men as well as ladies, supply mild as well as medium "smokes." Place ashtrays in convenient places. It is the hostess's duty to light a cigarette first to signify that smoking is allowed. if she does not care to smoke herself she can extinguish her cigarette.

The most important part of all is supper. Be it set, buffet, or hand around, supper very often ends in disaster. Many a good frock is ruined by spilt tea or coffee. Be careful not to overcrowd the table with food and in the case of set, also do not overcrowd the table with guests. Have it set with space between each dish and place the cakes, &c., on stands, which look more effective and do not take up so much space. Have flowers in tall vases, or if preferred, crystal or glass bowls. Do not choose gaudy or strong-smelling blooms, but long-stemmed pastel-shaded ones, which must be arranged with a fair amount of green. Iceland Poppies are very effective, but if chosen for the table, do not forget to put a small piece of charcoal in the bottom of the vases in which they are placed. This seems to deaden the strong smell from them.

To give a festive appearance to the supper, do not forget sweets and nuts placed in dishes along the table. Devilled almonds, too, are very popular. For a party on a larger scale, trifles, jellies and salads are great favourites.

Fruit cake, biscuits and savouries too are essential. Savouries which are especially popular at bridge and cocktail parties are very nice and quite easy to make, and many folk prefer them to sweets. Cocktail Rolls are nice and dainty. They are tiny sausage rolls, seasoned with chopped parsley and other herbs, through which a tooth pick is stabbed.

Sandwiches, too, play an important part on the supper table. These must be very daintily cut and garnished with shreds of lettuce or sprigs of parsley. In addition to the usual ham and beef fillings it is wise to vary the sandwiches. There are many delicious fillings; a very popular one is minced sultanas, currants and nuts, moistened with a little milk. This is especially nice on brown bread. Another dainty summertime filling is tomato seasoned with grated cheese, salt, and a pinch of cayenne pepper. Many folks like to know the filling of the sandwiches, and the wise hostess will make little white paper flags, neatly print the name of the sandwiches on it, fix to a toothpick and stand up on the tray of sandwiches.

Recipes.

Four-in-One Biscuits.—Ingredients, ½ cup butter, 1½ cup sugar, 1 egg, 2 cups flour, ½ teaspoon salt, 2 teaspoons baking powder, ½ cup milk, almonds 1oz., chocolate, chopped nuts, cocoanut. *Method.*—Cream butter and sugar, then beat the egg in well. Add the sifted flour, baking powder and salt alternately with the milk, making a stiff dough. Have it of a consistency that it will not spread when placed in the oven. Divide mixture in 4 parts. Flavour first part with vanilla, put on baking sheet in little balls and put a blanched almond on top of each. The cooking will flatten them. Cook in a quick oven for 10 minutes, or until nicely brown. Remove from sheet as soon as they are cooked. Now take the second lot, melt the chocolate, add to the dough, spread out to about ½ inch in thickness in a square baking tin, and sprinkle top with finely-chopped nuts. Cook as for almond biscuits and cut into strips when taken out of oven. To the third section of dough, add 2 tablespoons of cocoanut, and put in square tin.

Sprinkle top with coarse cocoanut, and cook till brown. Cut into fingers when taken from oven. To the last quarter add a teaspoon of ground ginger and place in square tin. Sprinkle top with sugar and cook as above. When baked, cut into squares in tin and ice with pink water icing.

Sponge Fillings.—A mock cream made with butter, icing sugar and boiling water flavoured with mashed bananas or passion fruit is always delicious as well as popular.

Pineapple Filling.—Grate 1 cup of raw pineapple and cook in a saucepan with 1 cup of water until tender, add ½ cup sugar, and 1 teaspoon of butter and simmer for 2 minutes, then add 1 beaten egg yolk, and 1 dessertspoon of cornflour, moistened with the juice of ½ a lemon or orange. Passion fruit pulp can also be used. Cook another 2 minutes and remove from fire. Add 1 stiffly beaten egg white. When cool spread between sandwich.

Lemon Filling.—Take ¼lb. of butter, 2 small eggs, the juice of a lemon, the rind of ½ lemon, 1 oz. of butter. Put all ingredients into a saucepan and stew gently until it becomes the consistency of honey. Take off fire and allow to cool before putting in the sponge.

Banana and Jam Filling.—Mash 3 bananas with a silver fork, add 3 tablespoons of raspberry or any other kind of jam; if desired add 2 dessertspoons of fresh cream.

SAVOURY RECIPES.

Chicken and Ham Puffs.—When making these, make a double quantity, and when cold fill half with cream and the other half with this filling: Take 4 tablespoons cold minced chicken, 2 tablespoons minced ham, 1oz. butter, ¾ cup milk, I heaped dessertspoon of flour, 1 tablespoon cream, salt and pepper to taste. Melt the butter, remove from fire, add flour, blend well, using a wooden spoon, add milk by degrees, stirring well; return to fire and stir till it thickens, cook 3 minutes. Allow to cool. Stir in cream and chicken, ham, and seasoning.

Cheese Gondolas.—Bake some short pastry in boat-shaped patties. When baked, fill with this mixture: Whip some cream, flavoured with grated cheese, salt, and cayenne pepper. Sprinkle tops with grated cheese and a sprig of parsley.

Wrapped Olives.—Remove the stone from the olive by cutting spirally. Fill the cavities with a little minced ham, roll each olive in a small rasher of bacon and place in a hot oven until bacon is cooked. Serve olives with a toothpick stuck through them.

Savoury Prunes.—Soak prunes overnight, and in the morning drain and stew gently till tender. When cool split and remove the stones. Place a blanched almond in each, also a little salt, cayenne pepper, and grated cheese to flavour. Wrap each prune in thin bacon rashers, skewer them, and bake between two enamel plates in a hot oven until bacon is cooked. When ready, stick a toothpick through each and serve.

Fillings in Cream Puff Savouries.—Whipped cream seasoned with grated cheese, salt, and pepper is delicious. Brush the top of each puff with melted butter and sprinkle with grated cheese.

Minced tongue, chicken, or ham bound together with whipped cream and chutney is a delicious filling. Mashed salmon mixed with a good butter and breadcrumb sauce is another.

THE BENEFITS AND INFLUENCE OF SPORT TO THE YOUNGER GENERATION.

[Miss J. LINES, Wasleys.]

Sport is the best and most pleasant form of recreation young or old can indulge in. It is often the foundation of a young life, for through the medium of sport one becomes ambitious, alert, accurate, learns to be fair, to give and take in all things, and gener ally proves more efficient to gain success in life. Sport also keeps one young and active when advanced in years. People, although middle-aged or over, still enjoy two or three strenuous sets of tennis on an afternoon and declare that they could go on playing for years to come yet.

Some people say that sport preserves the figure; I do not think there is much hope for the tennis courts to aid slimming. One thing it does show is that the bigger girl still has the better chance in sport, and also that for small people it does help to develop the muscles and body.

Sport, while proving itself beneficial in several cases to young people, can also get such a grip on a person so that one becomes too keen, and then everything else is forgotten, and sport becomes their only ambition. There is probably more sport played at the present time than ever before, unemployment, of course, being the cause of a lot of it. It is going to be very hard on young people, especially when the time comes for them to give most of it up and return to work again after years of unemployment.

The real benefits and enjoyments of sport often result in giving most pleasure in the latter part of one's life, because when people get up in years and have any amount of spare time, what more enjoyment can they find in life than having a few hours' pleasant recreation at their favourite sport.

THE HOME LIBRARY.

[Miss JEAN DAY, Wasleys.]

The first books to be thought of for a home library are books of reference, a dictionary, encyclopaedia, and a map or good atlas. One would be very surprised to find how often people misspell, and almost everyone needs to look up a word in the dictionary now and then. Very often when a person is conversing with another he will hear some unusual word and not know the correct meaning of it. Consequently the dictionary is used and most likely that person will afterwards find himself using the word also.

The map or atlas is a book which is almost in constant use in most homes. Even the children will follow the flight of an aviator or the route of a ship, or maybe, in response to a parent's request, will find the place of the latest volcanic or political upheaval.

An encyclopaedia in the home is of great benefit to young and old. Think of the satisfaction of being able to find an answer to most of the questions that crop up, such as "Where does this or that come from?" "From which country and which part?" "Where is a certain city or river," "When and where did some great man live and why was he famous?" If there is a student in the home an encyclopaedia is indispensable.

If a member of the house has some special hobby you may be sure to find several books in their library concerning it, such as a bird book or a gardening book. Some may like to refer to a book of etiquette at times, and being able to do so may prevent embarrassment in unfamiliar situations, and it is reassuring to know how to begin and end some special letter. A medical book should find a place on the shelves; not to rely on it as a substitute for a doctor when he is necessary, but often his services may not be required and the medical book is sufficient. People who care for animals should always have the best veterinary guides, especially where advice cannot be easily obtained. The rest of the books may be novels and boys' and girls' books.

People say that girls should not be rushed into womanhood by reading trashy sentimental novels, but should read books like "Lorna Doone," "Little Women and Good Wives," or some of Ethel Turner's or Vazey's books. It is a particularly good sign in a girl when she enjoys a boy's book, and here in passing let us note how the average boy despises girls' books, and if he does read one it is usually accompanied by contemptuous snorts and sarcastic remarks.

For the boy who is growing up there is wealth indeed! "Robinson Crusoe," written 200 years ago, still interests the boys. Dickens' books and Sir Walter Scott's are typical boys' books also.

For boys and girls in their first stage of High School, Cassell's "Book of Knowledge" is recommended. A home cannot supply all the necessary books for reading, therefore a circulating library is always welcomed. The home library is not complete without some of Shakespeare's plays, and people will find they can read these many times without finding them boring.

All worth-while books broaden our minds, and help us to think for ourselves, and we find that our minds are not cold storage plants for the thoughts of others, but a powerhouse for our own.

SPONGE CAKES.

[Mrs. C. GORDON, Clare.]

Hints.—When making a sponge use eggs a few days old. Always beat eggs a few minutes before adding sugar; if eggs and sugar are put together before beating eggs the sponge when cooked often shows yellow streaks or specks. Never beat after adding flour and rising. When the eggs and sugar are ready, gradually fold in the flour a little at a time. Always sift flour for lightness. No matter how well a sponge is made it is never very attractive without a nice filling. In making sponge sandwiches the best results are obtained by using fairly high tins in baking; it gives the mixture enough room to rise. The oven will be the right heat if scones are baked properly first. It seems a good test; if they come out all right then it is ready by the addition of a very small supply of wood to bake the sponges. Line the bottom of the tins with greased paper and grease the sides with butter, preferably unsalted. When making butter keep a very small portion on one side before it is salted for greasing tins for cooking. It is not so liable to burn.

Plain flour and carbonate of soda and cream of tartar are always more successful than self-raising flour, except for sponge roll and sponge lilies. I have had great success with the self-raising flour for both of them, and have used pickled eggs as successfully as fresh, so long as the yolk is not broken when they are cracked. Do not beat any cake for 20 minutes, such as 10 minutes for eggs and 10 minutes later on. It would be a waste of time; they are eaten quicker than that. If a warm basin is used—just rinsed well with boiling water—the eggs and sugar mix very much more quickly and thoroughly, which is a most important item.

Prize Sponge.—Four eggs, 1 tablespoon cold water, 1 cup sugar (not heaped), beat well, add ¾ cup flour (good measure), 1 teaspoon cream tartar, ½ teaspoon carbonate soda, 1 heaped tablespoon cornflour.

Mock Cream Filling.—One cup milk; when boiling thicken with 1 tablespoon cornflour; set aside to cool. In a basin beat well 2 tablespoons icing sugar, 1 tablespoon of butter, then add gradually the thickened milk and essence.

Coffee Sandwich.—Three eggs, 1 cup self-raising flour, 1 cup sugar, 1 tablespoon butter melted in 4 tablespoons boiling water. Beat eggs and sugar well, then mix flour, lastly add butter melted in boiling water, stir, but do not beat. Bake in sandwich tins in moderate oven.

Filling.—One tablespoon strong coffee, as much icing sugar as it will take up 1 teaspoon butter; beat together and put between cakes.

Sponge Roll.—Six eggs, 1½ cups sugar, 1½ tablespoons water, beat well; add 1½ cups flour (level), 1½ tablespoons cornflour, 1½ teaspoons cream tartar, ½ teaspoon carbonate soda; bake 10-15 minutes. Turn out on warm damp cloth, roll up for a few seconds, then unroll and spread with jam or filling. A nice chocolate roll can be made by the previous recipe by taking out 1 tablespoon flour and replacing with cocoa and filling, being icing sugar mixed to a smooth cream with melted butter and essence.

Cake Fillings.—Two tablespoons butter, 3 tablespoons sugar, 1 egg; beat all together; add juice and rind of lemon, boil till thickens.

Cream Substitutes.—Beat well together 2 tablespoons each butter and sugar; add 1 tablespoon each milk and hot water. Beat all together for 5 minutes, add essence.

Delicious Filling.—Grate 1 cup raw pineapple and cook it in a cup of water until tender; add ½ cup sugar and 1 teaspoon butter and simmer for 2 minutes, then add a well-beaten egg yolk and 1 dessertspoon of cornflour moistened with juice of half a lemon. Cook for 2 minutes, take off, and add 1 white of egg, well-beaten. Use when cold in place of jam.

Sponge Sandwich.—Three eggs, small cup sugar. 1 cup flour, 2 teaspoons cream of tartar, 1 teaspoon carbonate of soda, 3 tablespoons warm milk beat eggs to a froth, add sugar, beat well, add flour with very little stirring. Put cream of tartar and soda in a basin, mix well, pour the warm milk over, and add to cake as quickly as possible and bake in moderate oven for 10 minutes.

Cinnamon Sponge.—¼lb. butter, ½lb. each sugar and flour, 3 eggs, 1 teaspoon soda, 2 teaspoons cream tartar, 1 tablespoon cinnamon, ½ cup milk. Cream butter and sugar, add eggs previously beaten; beat all together, sift cinnamon, cream of tartar, soda with the flour; add to the mixture; mix with the milk. Bake in sandwich tins in bottom of the oven ½ hour.

Butter Sponge.—Six ounces sugar, essence lemon, ½ pint milk, 3ozs. butter, 2 eggs, 1lb. flour, 1 teaspoon baking powder; cream butter and sugar lightly, add essence, beat in eggs singly, stir in milk, sift flour with baking powder and mix all thoroughly. Bake in moderate oven.

Three-Minute Sponge.—1 cup flour (level), pinch salt, 1 level cup sugar, 3 eggs, 2 tablespoons melted butter, 3 tablespoons milk, 2 teaspoons cream tartar, 1 teaspoon carb. soda. Put all ingredients in a basin in the order given, then beat vigorously for about 3 minutes. If it seems stiff, add 1 tablespoon cold water. Bake ½ hour in moderate oven.

Sponge Roll.—Two eggs, 2ozs. each sugar and S.R. Flour. Beat eggs and sugar to a froth. Sieve flour, add to the mixture very lightly. Spread the mixture in a flat tin and bake in a quick oven for 10 minutes. Turn out on damp cloth. Spread with warm jam. Fold twice.

Sponge.—Four eggs, pinch of salt, beat for 2 minutes. Add 1 cup of sugar, beat 10 minutes. Fold in 1 heaped cup of plain flour with 1 teaspoon cream tartar, ½ teaspoon carb. soda; lastly add 1 cup milk. Bake 25 minutes.

Sponge Lilies.—1 teacup sugar, 1 teacup S.R. flour, 3 eggs. Beat yolks of eggs until white and creamy, whip egg white to a stiff froth, then beat well with yolks and sugar. Sift flour and stir lightly into mixture. Drop dessertspoonful on a greased slide, allow

room to spread. Bake until a pale brown in a fairly hot oven. Do not allow them to become crisp or they will not roll. Remove the cakes quickly, one at a time, from the slide and while still hot twist into the shape of a lily. When cold, fill with sweetened whipped cream and put a small piece of jelly, preferably red, that has been made very stiffly, in the centre of the cream. When these are taken from the slide they cool very quickly, almost before you can roll them unless you have some one to help. By covering them with a slightly damp towel or cloth they keep soft until you can get them rolled.

TOMATO GROWING.

[MRS. GARRETT, Saddleworth.]

Seed should be sown in hot bed early in the season from April to June or in pots in a warm window facing the north. They should be started early and forced as rapidly as possible, whether by hot bed or open air culture. When about 2 inches high, they should be transplanted in single plants into warm, light, rich soil. It is a good plan to use a sprinkling of sulphate of ammonia in the ground for each plant. Water freely at the time of transplanting and shelter from the sun a few days or until well established. Also protect from frost in spring. A good plan is to cut old kerosene or petrol tins and cover at night. Train upon trelliswork or support by driving sticks into the ground and tying to them; they should also be pruned as they grow up on the trellis.

Of late years tomato production has become considerably reduced by "Spotted Wilt." The only cure known for this disease when noticed is to uproot the plants and burn them. One can usually tell when the plants become affected as the leaf becomes curly and the plants do not thrive. The fruit of a sick plant becomes striped and speckled; has no flavour, and consequently is unfit for use.

An early variety and good bearer is "Excelsior," the fruit being large and round, solid, and of good flavour. There are many other good varieties, which should be selected according to climatic conditions.

RECIPES.

Tomato Sauce.—12lbs. tomatoes, 1lb. each of apples, onions, and sugar, ¼lb. salt, 1oz. garlic and allspice, ¼oz. each of chillies, mace, and cloves, ½oz. curry powder, 1 quart of spiced vinegar. Wipe tomatoes, peel apples and onions, and cut garlic. Boil all together for 3 hours, then strain and bottle. If liked hot add teaspoon cayenne pepper.

BREAKFAST DISHES.

Tomato in Batter.—1 egg, ½ cup milk, flour, mix together, slice tomato and dip in batter and fry.

Onion and Tomato.—Slice and fry. Serve on toast.

Fry tomatoes in a little fat and their own gravy. Beat up one or two eggs, add pinch sugar and stir in. Serve on toast.

Tomato Relish.—6lbs. tomatoes peeled and sprinkled with salt overnight. Also 2 large onions cut and sprinkled with salt overnight. Strain off the water and add 1lb. white sugar, ½oz. cloves, 2ozs. bruised ginger in muslin bag, 1 teaspoon (level) cayenne pepper, 1½ bottles white vinegar. Boil all together 1 hour.

Tomato Sauce.—Take 12lbs. tomatoes, ¾lb. salt, ½oz. garlic, 1oz. bruised ginger, ½oz. cloves, ½oz. mace. Take the stalks from tomatoes, and put the whole into a copper or porcelain pan without covering. Beat the whole mass through a hair sieve if the seeds are objected to; if there be no objection to the seeds, beat through a colander. Pass the liquid through the sieve several times until the consistency of cream; then pour over the refuse 1½ pints of vinegar and beat the other liquid. Return the whole into preserving pan and add ½ teaspoon of cayenne. Stand over fire until it comes to the boil. Skim and let stand until cold, when it will be ready for bottling.

Tomato Relish.—6lbs. tomatoes (not too ripe), 3 or 4 large onions, 1lb. golden syrup, ½oz. whole cloves, 1 teaspoon whole white pepper, 1 bottle white vinegar, 2ozs. whole ginger (bruised). Cut tomatoes and onions into slices, place in a pan, and sprinkle freely with salt. Stand all night. Next morning drain off liquid and put ingredients in muslin bag before adding. Boil for 1½ hours.

Mock Raspberry Jam.—6lbs. tomatoes, 1 bottle essence raspberry, 6lbs. sugar. Remove any stems and peel tomatoes (by placing into hot water). Then slice and cover with sugar. Boil until some will jelly when put on a plate to cool (about 2 hours). Take off fire and add raspberry essence, and mix well. Bottle when cool.

Tomato Chutney.—4lbs. ripe tomatoes, 1lb. each apples, onions and sugar, 1 pint vinegar, 1oz. each salt, allspice, and pepper (whole). Boil ½ hour to 1 hour.

Tomato Sauce.—18lbs. tomatoes, 1½lbs. each apples and onions, 2ozs. garlic, ½lb. salt, 1 teaspoon each of mace, cloves, ginger, little cayenne pepper if liked, 1½lbs. sugar, 1lb. golden syrup, 3 pints vinegar. Cut up tomatoes and apples without peeling, put all other ingredients in stewpan and boil slowly about 4 hours. Then mash through colander. When cool stir well and bottle. If too thin boil a little more. If too thick, add a little vinegar.

Tomato Chutney.—12lbs. ripe tomatoes, 2lbs. sugar, ¼oz. cayenne pepper, 2 tablespoons salt, 2 pints vinegar, ½oz. cloves, 12 large apples, 2 large onions, 4ozs., garlic, ½lb. each currants and sultanas. Chop garlic, tie in bag with cloves and ginger; pour boiling water on the tomatoes and skin them. Peel and slice apples, chop rather finely. Boil all together for 3 hours or until thick.

TOMATOES AND THEIR USES.

[Mrs. J. W. Mullen, Wasleys.]

Tomatoes are used extensively in every home and can be used in numerous ways. For the hot days their use as a salad ingredient cannot be excelled. Mixed with lettuce, 2 or 3 tomatoes sliced and mixed with finely shredded lettuce make a very nice dish with mayonnaise salad dressing poured over it. Tomatoes are also nice if used as a garnish only for lettuce salads. Tomatoes are used extensively for sandwiches; many a child's and farm man's lunch is made appetising on a hot summer day by their addition. For a breakfast dish many an appetising meal can be made. Tomatoes are also used as a vegetable, also for soups, sauces, chutney, pickles, and jam.

Recipes.

Tomato, Cucumber, and Onion Salad.—Four large tomatoes, 1 medium size cucumber, 2 onions, 1 cup vinegar, 1 tablespoon sugar, ½ teaspoon salt and a little pepper.

Tomato Salad.—Peel and slice 12 medium-size tomatoes and pour over a dressing made with the following ingredients:—1 cup cream, 2 teaspoons Worcester sauce, 3 tablespoons vinegar, 2 tablespoons sugar, and little salt and pepper to taste.

Tomato Omelette.—To each egg used add the following:—1 tablespoon breadcrumbs, 1desertspoon milk, 1 tablespoon peeled and chopped tomato, pepper and salt to taste. Fry in hot fat.

Tomatoes on Toast.—Peel some tomatoes, put in saucepan or fryingpan with 2 thinly sliced onions, a piece of butter the size of a walnut, ½ teaspoon salt and little pepper. Stew in their own liquid until cooked, then add a pinch of carbonate soda and a teaspoon sugar. Thicken with a little cornflour and serve on hot buttered toast.

Fried Tomatoes.—Peel and cut in halves some tomatoes, sprinkle with salt and pepper, dip in egg and then in breadcrumbs. Fry in very hot fat.

Baked Tomatoes.—Peel and cut in halves some tomatoes and onions. Butter a piedish. Put a layer of tomatoes and then a thin layer of sliced onions. Last layer to be of tomatoes sprinkled with a little salt and pepper. Sprinkle breadcrumbs over top and put little bits of butter over it. Bake in oven ½ to ¾ of an hour.

Tomato and Meat Au Gratin.—Cut slices of cold cooked meat, place in a well-buttered piedish with a little minced parsley, onion, and breadcrumbs, pepper and salt. Put in a layer of tomatoes, then more seasoning, then meat. Cover with breadcrumbs and bits of butter and bake ¾ hour or longer.

Mutton and Tomato Pie.—1lb. loin chops, 4 tomatoes, 3 tablespoons breadcrumbs, 1oz. butter and a small slice of onion, pepper, and salt. Cut chops quite small and trim them. Butter a piedish and put in some crumbs, then slices of tomato, chops, and seasoning and another layer of tomato. Sprinkle breadcrumbs on top and bake from ½ to 1 hour.

Tomato Soup.—Take 12 tomatoes, 1 quart of milk, 2ozs. butter, a little carbonate soda, salt and pepper to taste. Cut up tomatoes, stew 20 minutes in their own liquid, throw in soda, and strain through a colander into milk and other ingredients which should have been boiled and thickened with cornflour. The soup must not boil after tomatoes are put in or it will curdle.

Ripe Tomato Chutney (1).—4lbs. ripe tomatoes, 1lb. each apples, onions, and sugar, 1 pint vinegar, 1oz. each salt, peppercorns, and allspice. Boil till thick enough.

Tomato Chutney (2).—4lbs. each tomatoes and apples, 2lbs onions, 2 teaspoons each whole spice, cloves, pepper and ground ginger, 2 tablespoons salt, 2 cups brown sugar, 3 pints vinegar; boil 3 hours.

Green Tomato Relish.—6lbs. green tomatoes, 2 large onions, 1 cup treacle, 2 bottles vinegar, ¼oz. cloves, 2ozs. whole ginger, 1 small teaspoon cayenne. Peel and slice tomatoes and onions and put them in an enamel dish, sprinkle with plenty of salt, and leave overnight. Pour off liquid. Place all ingredients in stewpan and boil one hour. Tie ginger and cloves in muslin bag.

Tomato Sauce.—25lbs. tomatoes, pulp by boiling rapidly until quite soft. No water should be added, but the tomatoes should be slightly crushed to commence the boiling. Pass the pulp through a sieve which will retain only the seeds and skins, then measure the strained pulp, and to each gallon of this allow 4ozs. salt, 1½lbs. sugar, 1½ozs. garlic, 1oz. each wholespice and cloves, 1 tablespoon mustard, ½ teaspoon cayenne, 1 quart vinegar. Boil sauce until of a right consistency. Acetic acid may be used instead of vinegar, but must be added after sauce has been removed from the fire. For this quantity of tomatoes use 5ozs. I have made this for a number of years with success.

Tomato and Raspberry Jam.—6lbs. each tomatoes and raspberries, 9lbs. sugar, juice of 2 lemons. Boil for 1 hour. This is a very good way in which to make raspberries, which are usually dear in price, go further.

THE USE OF LEMONS IN THE HOME.

[Mrs. W. MILLER, Clare.]

What drink is nicer in summer than a cold lemon squash and in winter a hot lemon drink? With two aspros added it is very good to break up a cold. The juice of 3 lemons, undiluted, and without sugar will generally stop vomiting.

Lemon juice in hot coffee will relieve a headache. Equal parts of lemon juice and glycerine are excellent if taken for an irritating cough. Before squeezing lemons place them in the oven for a few minutes, and you will get twice as much juice. When aluminium pans become black and dull, clean them with a soft cloth dipped in lemon juice, and rinse in warm water. To freshen stale vegetables soak them for one hour in cold water in which the juice of a lemon has been added. When cooking prunes add the juice and rind of half a lemon. To remove iron rust quickly and easily from any material, invert a medium-heated iron, place on it the stained fabric, and gradually squeeze the juice of the lemon on the stain. The mark will be carried away by the steam.

For removing verdigris from a copper, lemon juice is excellent. A few drops of lemon juice on the tooth brush will keep the teeth perfectly white. Slice 3 or 4 lemons and put in the bath water till the juice is extracted; they impart a delightful sense of freshness and cleanliness to the skin.

Lemon juice makes an excellent substitute for shoe polish. A few drops rubbed briskly on black or brown shoes imparts a brilliant sheen. Half a teaspoon of lemon juice added to the water when making puff pastry makes it light and fluffy. A little strained lemon juice added to the water when mixing icing will keep it soft for some time. The juice of a lemon added to the blue rinsing water when washing white silk will keep the silk pure white instead of turning yellow. A few drops of lemon juice added to the water used for rinsing the hair will make it both glossy and fluffy. Equal parts of lemon juice and milk mixed together make an excellent lotion which can be used to improve the colour of a dark-coloured neck. The same lotion can be used with pleasing results to remedy red hands.

Stains on the hands can be removed by rubbing with lemon juice. Lemon peel thoroughly dried and ground to coarse powder is very good for flavouring biscuits, small cakes and puddings. Lemons can be made into very nice marmalade, jelly and many different kinds of jam may be improved by adding lemons or juice of lemons. Lemons keep much better if put in a string bag and hung in a cool airy place or wrapped in tissue paper and kept in a crock of dry sand.

Candied Peel.—Save the skins of lemons. Soak in salted water for 3 or 4 days. Drain and boil in clean water until soft. Test with a skewer. Make a syrup by boiling 2 cups of sugar with 1 cup of water for 5 minutes. Put the peel in a basin, pour the syrup over it. Stand for 4 or 5 days; then strain off the syrup and boil it. Next, put the peel into the boiling syrup and boil until clear—about 15 or 20 minutes. Then spread the peel on a dish, put a little syrup in each. Sprinkle with sugar and dry in a cool oven or in the sunshine.

USES OF COLD MEATS.

[Mrs. J. C. Dux, Clare.]

When there is only a very small piece of meat of any kind, mince it and make a batter as for pancakes, put the mince in the batter, season to taste, drop spoonful of the mixture into a pan of hot dripping, fry a nice brown. This makes a good breakfast dish, especially with fried left-over vegetables.

With cold mutton make the following dish for dinner or tea:—Prepare vegetables, chiefly potatoes and onions, then carrots, turnips, parsnips and marrow. Use a casserole, or any deep dish with a lid or one piedish covered with another to keep in the steam. Lay sliced potatoes in the bottom of the dish, also on the sides, then a layer of sliced mutton or vegetables, repeat, until the dish is full, finishing with the sliced potatoes. Add tomato or parsley to make it tasty. This is an easy dish to prepare as it needs no watching. Use any gravy that is left, if not, use a little water, put it in the oven and bake from 1½ hours to 2 hours, according to size.

Dip slices of cold mutton, veal or any lean meat in a batter, as for fish and fry a nice brown. If a very small piece of cold meat, and it is desired to make it go a long way, mince it, add a chopped onion and seasoning to taste, make a scone mixture, roll out, cut into rounds, place a spoonful of meat in each round, roll in the shape of a dumpling and either bake, boil or fry it. Cold meats of any kind can be treated still in another way. Fry 2 or 3 onions a nice brown, take them and put aside. In the same dripping put what meat you have, cut into small dice or cubes, removing all fat and gristle, fry a nice brown, adding seasoning, then drain all dripping off, add browned onions, gravy, hot water and tomato sauce, simmer a few minutes and then thicken.

Corned lean meat can be made into a salad, cut into dice, add chopped onion, pepper, salt and vinegar to taste; just before serving add some cream. I often curry cold meat by simply adding curry to the flour when thickening an ordinary hash. Cold minced mutton mixed with tomato sauce makes nice sandwiches.

THE BENEFITS OF SOCIAL AFTERNOONS.

[Mrs. A. Page, Clare.]

One of the chief benefits derived from the meeting together of ladies in the afternoons is that it takes them away for a time, from their homes, and gives them an opportunity to meet together for social intercourse. Most women love their homes and take pleasure in home duties, but there is a time when one needs relaxation from the daily round, which, if it is not relieved, would be in danger of becoming dull and almost drudgery. Usually the most convenient time to meet is the afternoon, when domestic duties of the morning are over, and before the preparation of the evening meal. Some room should be selected for the meeting place, which is sufficiently large for the purpose, but not too roomy for the number of the company. Care should be taken to make the room comfortable, cosy in winter, and cool and airy in summer. Some care can reasonably be taken with the decorations so that a tasty and attractive appearance is given to the room which is to serve the purpose for the time being, at least, of a collective drawing-room.

The essence of these social afternoons is fellowship, for, unless every person in the room is made to feel "at home," the purpose of the gathering will not have been entirely met. Naturally the responsibility for this social atmosphere will rest upon the leader or the convenor of the meeting, or upon the persons who have been chosen to perform these special duties, but there is a part to be played by each lady, and everyone can contribute to the success or otherwise of these social afternoon gatherings. It is recognised that there are some people who have more social gifts, or are what is sometimes called, better "mixers" than others, and it is an opportunity for them to use their gifts to create a good social atmosphere and to make their more retiring neighbours feel perfectly at ease.

The aim should be to cause a pleasant impression to be formed by those who may attend the gathering for the first time, so that they wish to come again. While the primary object of the social afternoon should be fellowship, it should not be overlooked that it also affords an opportunity for instruction and the gaining of useful knowledge.

There are always some people who have specialized upon certain branches of knowledge. They should be encouraged to come forward and give their less informed sisters the benefit of their special knowledge. This may not be found easy, for there are many people who are efficient and capable of doing things, but cannot always put their knowledge into words, especially before a company of people. There are people whom we need who can talk in a most interesting and descriptive way about their travels, and yet if a suggestion is made to them to speak at "an afternoon" they immediately say, "No, I could not possibly speak in public."

Some people may think that they have no gifts as a public speaker, but they should be encouraged to make a beginning. In this manner a retiring lady may be brought out and thus bring pleasure and profit to others and indirectly to herself. There is also an opportunity given for a lady who has gifts as an entertainer. There are some who have the gift of music, and skilled performers. Possibly when they learned music they

had little idea of using their gifts in any place beyond the borders of their own home, but it should be remembered that the social afternoon room is for the time being a "collective home" and the pleasure that is given to the inmates of the home may well be given to the company assembled in the social room.

The essential purpose in these afternoon gatherings is to develop the art of profitable and entertaining conversation. Some may say that the power to converse is a gift, and cannot be cultivated, but experience has proved that this is not so. The more one practises the art of expressing thoughts and opinions and placing them into correct and suitable words, the more readily will the gift be exercised. There are those, however, who have not much brilliancy in expression and have no great command of words, but they are able to tell news in a kindly way. Everyone likes a person who tells something that he did not know, and is glad to know, and they are very welcome at a social gathering and can make a dull afternoon something very much more interesting.

It is a custom of modern times that a meeting—especially of ladies—should not close without afternoon tea. This may be regarded by some as an unnecessary feature of the afternoon and some may not care to indulge. Yet it appears essential that some form of hospitality should be offered and this appears to be the most fitting form for it to take. It creates an opportunity for more intimate conversation than can be indulged in during the meeting, and can be profitably used by the ladies as an opportunity of "getting to know one another." The serving of the tea itself is an art, and may well be regarded as an expression of true hospitality coupled with refinement. It would be wise if a reasonable amount of restraint is observed in the matter of provisions and anything like extravagance should be avoided. The key-note of hospitality should be tastefulness and daintiness and a perfect meeting can be brought to a fitting conclusion by a perfect tea.

These meetings should not be extended for an excessive length of time. Some ladies have more pressing duties than others, and it is not fitting that they should be compelled to hurry away before the meeting is concluded. At the same time, a warning note might be struck against that restlessness which is so characteristic of modern times. If a lady feels that she has not time to settle down to the afternoon meeting of the Bureau, she would be far wiser to send an apology. One should never crowd several engagements into an afternoon. This destroys pleasure, as well as being discourteous.

The ideal "afternoon" is one where the time flits by without being noticed, and where the impression left is so distinctly pleasing that there is a keen desire to come again.

MILLICENT (Average annual rainfall, 27.79in.).

February 15th.—Attendance: 9.

USEFUL HINTS.—Miss K. Hutchesson gave the following:—Sprinkle the top of the stove with salt before frying and grease will not mark the stove, nor will there be any smell of burning. Before cleaning the stove rub it over with turpentine. Mix blacklead with cold tea instead of water. If the stove has a dull appearance, clean with a good polish, then rub over with furniture polish. New tinware should be rubbed over with fresh lard and then thoroughly heated in the oven before using. Sprinkle a few tablespoons of salt over the fire after it is made up and it will keep going for hours without any further attention. To skin almonds, first soak them in hot water. Hard boiled eggs placed in cold water will shell easily. Tomatoes plunged into boiling water for a few minutes peel easily and without waste. Raisins will stone readily if warmed slightly, and candied peel should always be placed in the oven before being sliced. Grease the bottom of the saucepan before cooking and it will save much work when washing up. Add a little water to the saucepan and place it on the stove after the meat has been served; it will be almost clean when ready for washing. After cooking jam, soak the utensils in cold water; they will then need very little washing. If roasting poultry in a gas oven, put water into the meat tin at the bottom of the stove; this will obviate continual basting. Add a little soda to the water in which potatoes are soaked before cooking and the skins will be scraped off more easily. Flour the tins in which cakes and buns are to be cooked instead of using grease. The cakes will not stick if this is done. Window curtains can be taken from the line half dry and hung in position, then they will require no ironing and will fall smoothly into position. On a windy washing-day sheets and blankets wrap over the line. To stop this, place 3 or 4 spring pegs on the bottom of the clothes. Keep a magnet in the sewing basket to pick up any needles that drop on to the floor. Thread needles before cutting the thread from the reel; make the knot at the freshly cut end and there will be no trouble with knots.

MONARTO SOUTH (Average annual rainfall, 14 to 15in.).

February 16th.—Attendance: 10.

GERMAN COFFEE CAKE AND BERLIN PANCAKES.—Mrs. C. Altmann read the following paper:—Good ingredients, good yeast and a reliable oven are the first essentials in making these recipes. It is a mistake to be continually uncovering the dough. An old eiderdown or a large feather pillow is ideal for keeping the dough warm. If covered and kept in a warm place in the kitchen the dough will take about 3 hours to rise, providing that the sponge has been set for a few hours before. A good plan is to mix it the night before, then it can be made early next morning. Have all ingredients warm, also the flour, and mix the eggs with warm milk. *Recipe for Yeast*—½lb. potatoes, 1 pint water, ½ teaspoon salt, 1 tablespoon hops, 2 tablespoons sugar. Peel and cut up the potatoes and put into saucepan with salt and water. Boil until the potatoes are done. Put the hops in a basin and pour boiling water with the potatoes over the top. Cover with a plate and when cool put all through a sieve. Add the sugar and stir well. Put into a bottle and stand in a warm place. If there is a little yeast in the bottle to start it, it will be ready next morning. Another good hint is instead of throwing away the water in which the potatoes have been boiled for dinner, pour it over the hops and add some of the potatoes. *German Coffee Cake.*—4lbs. flour, 1lb. of butter or butter and lard mixed, 1lb. sugar, 1 quart sweet milk, 4 eggs, 1 teaspoon each mace and essence of lemon, 1 tablespoon salt and the bottle of yeast. If dripping is used, add the juice of ½ a lemon. *To set the Sponge.*—Beat the eggs and half the sugar. Add the yeast and enough flour to make a stiff batter, cover with a plate and put in a warm place for two or three hours to rise. Meanwhile put the rest of the flour into a large dish in which the dough is to be mixed. Make a well in the centre, add the sugar, salt and mace and the essence of lemon to the butter. When the sponge has risen, add to it the flour, also the warmed butter and milk. Mix all together with the hands and then beat for several minutes with the hands. Should the dough become cold, place it in the oven to rise again after covering it with a rug. When the dough again rises to the right size, it is ready to put into the tins, which should be well greased. Melt a little butter, and butter the hands, take out a portion of the dough and flatten it out on to the tins as evenly as possible. Place it in the oven for a few minutes to warm and cover again with rug. Then set it aside for about 1½ hours and while it is rising, prepare the top in the following manner:—2½ cups flour, 2 cups sugar, ½lb. butter and a little ground nutmeg or cinnamon. Rub the butter and sugar together, then add the flour and rub until crumbly. Another top is made by adding the yolks of 2 eggs and 6ozs. of butter. Fruit may also be used on top; plums or apricots cut in halves and pressed into the top of the cake top side up and then covered with sugar. Finally bake in a fairly hot oven for 15 to 20 minutes. *Berlin Pancakes.*—2lbs. flour, ¾lb. sugar, 6ozs. butter, 1 cup sweet milk, 3 eggs, ½ teaspoon ground mace, little essence of lemon, 1 dessertspoon salt and ¾ pint of yeast. Mix in the same way as the coffee cake. When it rises to its normal size, take small pieces of dough and form into small buns, put on to a baking sheet, then put away to rise for 1½ hours. These pancakes are cooked in hot fat. While they are rising, get the fat ready in a deep pan, lard is best but dripping will do. About 1½lbs. to 2 lbs. are needed. When the cakes have risen, put as many as the pan will hold into the hot fat and cook until a nice brown on both sides. Try with a skewer. Drain on brown paper and when cold roll in castor sugar. If it is desired to put jam in the cakes, flatten them when the buns are being formed, and place a teaspoon of jam between 2 cakes and pinch them together. (Secretary: Mrs. F. Liebelt.)

PENOLA (Average annual rainfall, 26.01in.).

February 6th.—Attendance: 56.

The February meeting took the form of a Dark Cake Competition, and the judge (Mrs. B. Black) made the following awards:—First prize, Miss R. Hill; second, Mrs. C. Neilson; third, Mrs. B. McDonald. Mrs. R. Rymill gave an interesting talk on the "Penola" and its equipment for the Antarctic Expedition. (Secretary, Mrs. Edith Kidman.)

WASLEYS.

March 7th.—Attendance: 30.

The following papers were read and discussed:—"The Benefits and Influence of Sport," Miss J. Lines; "Home Dressmaking," Miss M. Perry; "Literature in the Home," Miss J. Day; and "The Art of Entertaining," Miss J. Siebert. (*These papers will be published in the report of the Lower North Conference.*) (Secretary: Miss J. Braun.)

WILLIAMSTOWN (Average annual rainfall, 27.77in.).
February 6th.—Attendance: 8.

USEFUL HINTS.—Mrs. Johnston gave the following:—An eiderdown placed between two blankets instead of on top of the bed will give double warmth, and in the case of a restless sleeper is not so likely to slip off. A thin coat of varnish applied to straw matting will add greatly to its durability. Footmarks will not show on polished floors if the turpentine and beeswax are mixed with a small quantity of linseed oil. Keep a piece of strong brown paper folded about four times under the door mat. This will keep grit from working through and damaging the linoleum or flooring. When cleaning a grate, make a cloth and rub soot from the back of the grate or flues on all the greasy parts before black leading. This removes all grease and produces a brilliant polish. To remove paint stains from glass, rub the stains with a cloth wrung out in hot vinegar. Equal quantities of white pepper and powdered alum dusted on the bookshelf will keep silverfish, borers, and other pests away. Two or three slices of pineapple eaten first thing in the morning is a good aid to reducing weight. Raw meat sprinkled with sugar is a never-failing bait for a mousetrap. A good recipe for a whooping cough mixture:—Steep ½ cup of minced garlic in ½ cup of good rum and rub the soles of the feet, palms of the hands, armpits, chest, and back with the liquid night and morning. If the cough is troublesome and frequent, give 3 or 4 drops of the mixture on a teaspoon of sugar occasionally. (Secretary, Mrs. A. Cundy.)

WIRRABARA (Average annual rainfall, 19.29in.).
21st February.—Attendance: 31.

The monthly meeting was held at the residence of Mrs. A. Watt, who invited members to inspect articles of interest about her home. A large hessian tabelcover was shown, which Mrs. Watt had made from four sugar bags, joined together and cornered with pieces of cretonne. Another very attractive article was a deck chair cushion made from cretonne and filled with wood wool. Several hooked rugs were admired, and Mrs. Watt gave a demonstration of the stitches. The well equipped pantry with well stocked shelves of jams, pickles, preserves, &c., gave evidence of good home management. The shade house contained a fine collection of ferns and pot plants. The washhouse, with cement troughs, copper and troughs fitted with taps and drain pipes to carry away the water, showed thoughtfulness for the womenfolk of the household. (Secretary, Mrs. A. Curtis.)

GARDENING NOTES.

[Paper read by Mrs. H. Miles at the October meeting of the Kybybolite Women's Branch.]

September and early October are the busiest months of the year in the garden. In the vegetable garden as much ground as possible should be sown to ensure having summer and autumn supplies, and the chief varieties recommended for sowing and planting at this time are—beans, of which the last sowing of broad beans should be made early in the month, and then a little later on the first sowing of French and butter beans can be made in warm situations, and at the same time make a sowing of climbing varieties of beans. It is advisable to plant these alongside a fence. This will greatly assist the staking, and will also help to protect them from strong winds.

It is also a good time to sow broccoli and cabbage, the best varieties being Burpees, Succession, and Drumhead; and cauliflowers, Eclipse, Autumn Grant, Phenomenal are the best for summer planting.

For the best results with beet, grow Crimson Globe Egyptian rooted or Obelisk, and do not forget to sow a little silver beet for summer greens. For carrots, the Early Scarlet Shorthorn and Manchester Noble, Oxheart, and James Scarlet Intermediate are the best varieties, September is the best month to sow Parsnips, a much better germination can be expected of all varieties. Hollow Crown and Student are the best. Lettuce are essential for salads, &c. Iceberg, Neopolitan and Webbs Wonderful will give the quickest and best results. Small sowings of White Stone Turnips and Swedes are advisable, and, for those who are partial to radish, Long Red, White Icicle or Turnip Rooted are best. The best varieties of Peas for main crop sowing are Greenfeast, and for later, Yorkshire Hero. A small plot of Parsley is useful in the garden; Triple Curl Leaf is the best.

The seed for early potaties should be sown in October, for light soils, Red Skins varieties; the White Skinned varieties generally give best results.

Early sowings of Cucumbers, Melon, Pumpkins and Marrows, can also be made in October. In colder districts, a hot frame is necessary, but in the warmer parts, they may be planted in the open. With Cucumbers, there is the choice of a number of varieties, the foremost being Crystal Apple, Apple Shape, White Spine, Short Prickly and Marrow. The Bush varieties can be recommended. They yield almost as well per plant as the trailing varieties, and only need at the most a quarter of the space.

Jerusalem Artichokes are worth a space in any garden, to some it is necessary to acquire the taste for them, but they are an excellent standby for a variation in the vegetable menu. The home gardener must give consideration to what is best to grow when space is limited. Undoubtedly the great majority of amateur gardeners grow the vegetables they are most partial to, and where pounds, shillings, and pence do not enter into the matter, this is the correct policy to follow, but when the garden is small, it is surely more profitable to concentrate on those varieties from which the biggest returns may be had, and this will include all quick maturing crops, so that the ground may be cropped at least twice during the season; when one's area is not limited, and help can be had, there is no necessity to consider which crops to grow, and what to leave out. In considering the most profitable vegetables for the small garden, commence with root crops, which usually constitute the first sowings, Early Beets, Carrots and Parsnips must find a space. They are useful and need not necessarily occupy much room. French and Butter beans usually can be relied on to do well under average conditions, and are profitable crops for a small garden. Choose stringless varieties, and successive sowings should be the rule—sow a few rows at a time at intervals of 2 weeks, and thus have a regular supply during the entire season.

Tomatoes must be included in this list, even if only a dozen plants, this number will give sufficient fruit for a small family, budded and carefully tended, each plant may produce up to 10lbs. of good tomatoes during the season. Lettuce requires plenty of moisture to make good firm hearts, and if the seed is sown where it is to remain, and the young plants thinned out, they are not so liable to run to seed. Although it takes slightly more room than the ordinary vegetable, space should be kept for the Apple Shaped varieties of Cucumber. They are small and round with fine white flesh, and sweet flavour. They are very early and productive and more digestible than other varieties.

Peas if pulled at the right stage are not surpassed by any other vegetable. The Dwarf varieties should be grown. The yield and size of pod and pea, equal any of the tall varieties and they are heavy croppers. By growing Dwarf Peas, the labour of staking the rows is unnecessary, and they can be grown in rows with little more than 18 inches between the rows. For an effective show, plant against fences the Scarlet Runner and White Monarch Beans, which are unequalled, but early sowing is not advisable as the flowers fall off and very few beans set, It is better to delay sowings until the end of November for successful crops.

The growing of Tomatoes from seed requires a certain amount of detail. The Tomato plant should be stocky and sturdy when planted out. Perfect plants can be grown from seed in a few weeks. In a mild, hot bed, the seed germinates in a few days, When sowing seed, the compost should be a light, sandy texture and seed sown thinly, for if too crowded, they damp off. Water at this stage should be given sparingly, just sufficient to keep the soil damp, and always in the early part of the day. The seedlings should have richer soil than that provided in the seed bed, and plenty of air and sunshine and soil. Keep moist, not sodden. Asparagus beds require thin regular spring dressings. The best method is to use a fork. Be careful to loosen all the soil to a moderate depth, taking care not to go too deeply to injure the crowns of the plants. This very necessary work of forking and dressing the bed will be necessary every spring in order to improve and loosen the ground, and give full liberty for the buds to shoot up as well as free access of the sun, air, and rain. After the beds have been forked, they should be raked over smoothly and evenly with a rake. The work should be done early in September, as the buds will now be making a start, and will shortly appear above the ground.

The Flower Bed.

The cleaning of all flower beds should be proceeded with early in the month in preparation for sowing and planting for summer display. Any winter flowering plants that have finished flowering should be removed, and their places given to hardy annuals for late spring and summer flowering. September may be classed as the month for annuals and where provision was made during autumn, young plants of some of the varieties should be nearly ready to plant out. These, of course, will give a longer display of bloom. The sowing of half hardy varieties such as Asters, Balsams, Cosmos, Marigold, and Zinnias will be better deferred until beginning of October, as they require a fair amount of warmth to ensure germination, and even then when above ground, require protection from frosts. Make the first sowing of these sorts in boxes or a frame so they can be covered when frosts threaten. Suitable seed boxes for the purposes are about three inches deep and of a convenient size to handle. Put a thin layer of decayed manure in the bottom. This will act as a drainage and will supply the plants with nourishment later on. Fill boxes to within ½in. of the top with good sandy loam, and sow the seed thinly on this, just cover out of sight with fine soil and give a light watering to be followed by a sprinkling occasionally to ensure the soil being kept moist. From sowing of hardy annuals made now, strong plants should be

ready for planting out in a few weeks. As the greater the amount of growth made before the hot weather sets in the better the display will be, so it will be seen that every week gained in getting the young plants fit for planting out is of much consequence, therefore commence sowing as soon as the weather conditions permit. A selection from the following popular varieties can be made for sowing in October. Ageratum, the floss flower, used principally for summer bordering, Amaranthus, the equivalent to outdoor Coleus is very effective in a border. Sow late in the month. Antirrhinum, all varieties of Calliopsis, both the Drummondi and Bicolor, and the double varieities of the Bicolor are particularly effective for decorative work. Candytuft, variety, Celosia, and Cockcomb are both beautiful annuals, but should not be sown until the end of the month. Dianthus, double and single; Gallardia annual and perennial, Hollyhocks of which there are gorgeous colourings, Lupins, annual and perennial; Mimulus, Musk, and Nasturtium, Phlox Drummondi, Portulacca, this plant in a warm situation. Pentstemons—Stock 10 week and Beauty of Nice; Salpiglossis, Sunflowers, Scabious, Verbena, Wallflower and Zinnia, Dahlia flowered. The transplanting of hardy annuals and perennials from autumn sowing should be done as soon as the plants are ready. They will quickly fill any blank spaces in the garden and be in flower in a few weeks. Sorts that should be planted out are:—Calliopsis, Antirrhinum, Stocks, Phlox, Calendulas and Petunias. Be sure and plant Salpiglossis into the bed they are to grow, they will give excellent results from seeds sown into flowering quarters and stand up admirably to the heat; after the first flowering is finished cut the plants back and they will respond with new growth to continue flowering into autumn. A bed of Zinnia, the Dahlia flowered variety, with a border of Linaria, make a marvellous show. These plants require to be set about four inches apart, otherwise the planting will look somewhat thin, pinch them back in early stages and they will grow bushy, which is most desirable. Setting the seed of these plants where they are to grow is more satisfactory as they get a very hard set-back in transplanting.

At the November meeting Mr. McCarthy spoke on "The Work of the Education Department." (Secretary, Mrs. W. Keckwick).

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Tantanoola	6/2/35	11	"Gardening," Mrs. Searle	Mrs. E. Telfer
Warramboo	15/2/35	10	Question box	Mrs. A. Steer
Gladstone	19/2/35	32	Paper—Mrs. Schmidt	Mrs. L. Sargent
Penola	1/3/35	130	Cake Competition	Mrs. Edith Kidman
Saddleworth	5/3/35	11	"Tomato Culture," Mrs. Garrett	Miss. G. Frost
Clare	2/3/35	35	"Sponge Cakes," Mesdames Penfold and Gordon	Mrs. A. Pollock
Sheoak Log	7/3/35	28	Address—Miss Barnett	Miss K. Koch
McLaren Flat	7/3/35	11	Discussion	Miss I. Nicolle
Belalie	12/3/35	28	Papers—Mesdames Hawke and Symonds	Mrs. E. Orchard
Wilmington	12/3/35	52	Address—J. O. Hatter	Mrs. P. Cole
Boor's Plains	28/2/35	50	Address—J. B. Harris	Miss L. Stanway
Wilmington	12/3/35	27	"Biscuits," Mrs. Bury	Mrs. P. Cole
Morchard	27/2/35	10	Paper—Mrs. Martin	Mrs. C. Schulz
Laura Bay	12/3/35	9	Question Box	Mrs. R. Burke
Gladstone	19/3/35	48	Social	Mrs. L. Sargent
Mangalo	13/3/35	11	"Pie Melons," Mrs. Gaston	Mrs. B. Coles
Monarto South	16/3/35	17	Social	Mrs. F. Liebelt
Kybybolite	12/2/35	14	Papers—Mrs. L. Cook	Mrs. W. Kekwick
Balhannah	20/3/35	16	Social	Miss D. Spoehr
Pinnaroo	8/3/35	23	Question Box	Mrs. F. Atze
Kangarilla	21/3/35	7	Question Box	Mrs. M. Steer
Warramboo	15/3/35	14	"Needlework," Miss Chilman	Mrs. A. Steer
Parrakie	27/3/35	40	Social	Miss J. Halliday
Morchard	27/3/35	13	Question Box	Mrs. C. Schulz
Yurgo	18/3/35	18	Social	Mrs. R. Sanders
Auburn	29/3/35	17	"Tomatoes," Mrs. Schmeel	Miss L. Dennison

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. MAY 15, 1935. No. 10.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

River Murray, at Moorook, Thursday, June 20th (S. Perkins, Secretary).

Upper North, at Booleroo Centre, Wednesday, July 17th (Wepowie Branch, E. C. Roocke, Secretary, Booleroo Centre).

Hills, at Lenswood, Thursday, August 22nd (B. F. Lawrance, Secretary).

Murray Lands (East), at Alawoona, Thursday, October 3rd (A. J. Pengilly, Secretary).

Fruit (Non-irrigated), at Lyndoch, Tuesday, November 5th (J. S. Hammat, Secretary, Williamstown).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Pruning Competitions.

McLaren Flat, June 22nd; Berri, June 25th; Barmera, June 26th; Moorook, June 27th; Cadell, July 2nd; Waikerie, July 3rd; Moorook (Championship), July 4th.

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. H. B. Barlow, H.D.D. (Chief Dairy Instructor).]

Effect of Ensilage on Quality of Milk.

South-East Conference, "What would be the effect on the quality of milk for cheese making purposes when cows are fed on ensilage which has a decidedly objectionable smell?"

Reply—If high smelling ensilage is fed to cows, either just before or during milking, it would be very liable to taint the milk. In addition, feeding ensilage in the bails would have a tendency to impregnate the atmosphere, especially in enclosed bails, with mould spores and certain types of organisms often associated with ensilage which is not perfectly cured. Normally, if well-cured, good ensilage is fed at least four hours before milking and preferably fed in the open, away from the bails, no trouble from tainted or contaminated milk is likely to occur. Although many cheesemakers appear to think that the feeding of ensilage is detrimental to the quality of the milk, it is interesting to note that the cows at the Hawkesbury College Dairy are always fed with ensilage whilst being milked, and the year before last the factory exported 100 per cent. choice cheese made from this milk. At Roseworthy College the cows are regularly fed with ensilage whilst being milked and no taint is noticeable in the milk. Ensilage with a very objectionable smell would indicate some fault in the curing, and in this case it should be fed outside and after milking.

Quality of Cream at Kalangadoo Factory.

South-East Conference, "Why are so many producers receiving 'second grade' for their cream from the Kalangadoo Factory?"

Reply—The reason that a greater amount of second grade cream is being noted from the Kalangadoo Factory of late is that the graders at the different factories are now compelled by law to grade the cream correctly and notify the suppliers if the cream is second grade. Previously the suppliers may not have been notified when their cream was second grade. The percentage of second grade cream received or reported at Kalangadoo is considerably less than the percentage noted at most other factories. Because of the favourable climatic conditions, if reasonable care is taken of cream on farms, the percentage of second grade should be comparatively low.

F.A.Q. WHEATS COMPARED.

The Director of Chemistry (Mr. W. T. Rowe) has reported to the Hon. Minister of Agriculture that the f.a.q. samples of South Australian wheats for the seasons 1933-34 and 1934-35 have been milled in his department, and the flours obtained from the wheats have been analysed with the following results:—

WHEATS.

	1933-34.	1934-35.
	Per cent.	Per cent.
Moisture	9.9	10.1
Impurities (screenings, &c.)	—	4.2
Protein (N x 5.7)	11.1	10.7
Bushel weight	60lbs	60½lbs.
Milling test—	Per cent.	Per cent.
Bran	19.2	19.5
Pollard	9.7	9.7
Flour	71.1	70.8

The protein of each sample was calculated on wheat containing 10 per cent. of moisture.

FLOUR.

The analyses were calculated to flour containing 13.5 per cent. of moisture.

	1933-34	1934-35
	Per cent.	Per cent.
Ash	0.44	0.44
Protein (N x 5.7)	9.2	8.3
Wet gluten	24.2	23.8
Dry gluten	8.6	8.1
Water absorption	56.0	56.0
Hydrated maltose	1.36	1.70
Colour	Excellent	Excellent
Standard loaf volume	437 ml.	425 ml
Standard loaf weight	133.4 grammes	131.4 grammes
	Per cent.	Per cent
Baking score	39	38

Mr Rowe points out that there is a considerable falling off in protein in this season's wheat

VETERINARY INQUIRIES.

[*Replies supplied by Veterinary Officers of the Stock and Brands Department.*]

Hon. Secretary, Blackheath Agricultural Bureau, asks (1) *Are sheep affected with "dry bible" in the same way as cattle?* (2) *If sheep are affected with "dry bible" what could be done to prevent it?* (3) *Is there any remedy when once a sheep is affected?*

Reply—The term "dry bible" is a misnomer as "the bible" (third compartment of the stomach) is always dry and hard, its function being to squeeze and pulverise the food eaten before going on to the fourth compartment (abomasum) where the main act of digestion takes place.

The term "dry bible" is often used by stockmen to cover any condition of constipation of the bowels or impaction of the paunch (rumen, the first compartment of the stomach), and in other cases affections in which there is a paralysis of certain groups of muscles, brought about by the eating of damaged fodder or chewing bones

infected with certain germs which secrete a poison. These paralysed conditions are known as "parabotulism" and the parts generally affected are the muscles governing swallowing or movement of the limbs and sometimes those of the stomach and bowels.

Sheep may become constipated or the paunch impacted with food, but it is uncommon when running free in the paddock, except in those cases where "fibre balls" form in the paunch, or in the fourth compartment of the stomach, as the result of swallowing wool or fibre from dry grass which is formed into various shaped hard masses by the movement of the stomach, and blocks the onward normal movement of food. In such cases the symptoms exhibited are very vague and the condition can only be determined after death by finding the balls.

In any case, there is little that can be done in the way of treatment, except to give a purgative such as Epsom salts (4ozs. to 8ozs. in water) or raw linseed oil, 4ozs., with the hope that the obstruction is not too great to pass on. Many sheep remain healthy until they die, depending upon the size which the balls attain.

While sheep are on dry feed a laxative may be supplied (with the object of preventing any risks of constipation) such as:—Common salt, 90lbs.; Epsom salts, 5lbs.; molasses, sufficient to make the lick palatable.

Hon. Secretary, Agricultural Bureau, Black Springs, asks (1) *Is it possible to make common salt into a solid to be used as a lick? and* (2) *Cure for greasy heels in horses.*

Replies.—(1) Commercially, blocks of salt can be purchased which apparently are turned out by machines under pressure and generally mixed with other ingredients such as sulphur, phosphates, and iodine. The crude form of common salt (sodium chloride) often occurs in the form of natural deposits which is sold as "rock salt." Equal parts of coarse common salt and superphosphate placed in a kerosene tin and slightly moistened will set as hard as a brick and is a good lick for cattle.

(2) There are two conditions which must not be confounded with one another, namely, grease and greasy heel. The term "grease" is applied to a chronic inflammation of the skin in the region of the fetlocks and pasterns, and which may even extend almost up to the knees and hocks. The skin secretes an excessive amount of moisture, is red and inflamed and thickened, and often there develops small wartlike growths. The discharge becomes thick and gummy and has a very offensive smell, which is a characteristic of the complaint. It usually affects horses with thick, coarse legs, kept in dark, damp stables or other unhygienic conditions. The cause has not been discovered.

The term "greasy heel" is applied to an inflammation of the back of the pastern which becomes inflamed and exudes a yellow coloured, clear discharge and generally accompanied by a fissuring of the skin. In this complaint there is not the same offensive odour and it is usually brought about through washing of the legs and exposure to the wind before they are thoroughly dry. Another cause is the accumulation of mud, sweat, and other debris.

Treatment—"Greasy heels."—Clip hair back close to the skin, then wash with warm water and soap. Dry and apply a dressing of zinc ointment, cover with a layer of cotton wool, and bandage. Remove in 24 hours and apply zinc oxide powder, 4 (four) parts, powdered starch 1 (one) part, cover with wool and rebandage. Continue this treatment on alternate days for 7 to 10 days. After the first washing do not wash again for a week. There are other dressings that can be used, such as white lotion (obtainable from the chemist). "Grease" is very difficult to treat successfully, but the following treatment may be tried:—Clip the affected leg or legs as high as the knee or hock, wash thoroughly with hot water and soap, and apply the following dressing daily—Formalin, 1 part; methylated spirits, 5 parts; glycerine, 10 parts.

INCREASING THE STOCK CARRYING CAPACITY OF MALLEE FARMS.

[By R. L. Griffiths, D.D.A., Agricultural Instructor.]

Future developments in the recently settled Mallee areas of South Australia present a problem which is exercising the minds of many people at the present time. Much of this country possesses a moderate to low rainfall, and soils of only medium average quality. This is certainly so in the Murray Mallee District, where the rainfall has a range from 17in. in the south to 9in. in some of the northern marginal land, and where the soil, though including some parts of high fertility, partly consists of more or less sandy areas, reasonably fertile when just cleared, but becoming impoverished very quickly by usual cultivation methods. There are also other districts in the State with soil and climatic conditions somewhat similar.

Initial Methods of Mallee Farmers.

It has been considered necessary, for economic clearing of the land, to grow cereal crops. The procedure adopted in most cases—that of growing several crops,

Farms may be ruined by sand drift unless farming methods are changed.

mostly wheat in succession—in order to obtain a burn of stubble material for assistance in destroying mallee shoots, has been effective so far as the land clearing is concerned, though probably less crops and more fallow would have been more effective, even in this respect.

The clearing method adopted has had a very bad effect on both farmer and land. It has tended to develop farmers who are entirely wheatgrowers, who are very loth to alter their methods after the farm is cleared, and who, in some cases, even continue the attempt to grow part of their wheat crops without previous fallowing.

The land has been depleted of humus content—which, because of low rainfall and scanty vegetation, is never very high in such lands. Small amounts of vegetable matter have decayed and been incorporated with the soil during the countless years that the land was growing scrub, but very few crops, grown for grain, and with all residues burnt, quickly reduce the amount. The effects of low humus

content soon appear. It seems certain that the bacterial content of the soil is largely controlled by the amount of humus, and that the amount of available fertility is largely governed by the bacterial content.

The actual effects of low humus content are three in number:—

(1) The available fertility and moisture-holding capacity are reduced, so that—even with adequate dressings of commercial fertilisers, it is difficult to sustain high yields from the crops grown.

(2) The mechanical condition of the soil alters, making more difficult the control of sandy areas, so that drifting sand becomes an increasing menace.

(3) Plant diseases increase in severity. Recent investigations by Samuel and Garrett at the Waite Agricultural Research Institute tend to show that crops grown on soils deficient in humus are most subject to severe attacks of fungus diseases, particularly of Takeall, and experience in the field confirms this finding.

Methods of Retaining Soil Fertility.

It is quite essential, then, if Mallee areas are to remain fertile and profitable, that some method shall be adopted which will increase, and not further deplete, the humus content of the soil. There are three methods generally adopted throughout the world for this purpose:—

(1) Topdressing the land with animal manure from compost heaps or pits where the material has been carefully stored.

This applies chiefly to countries with such low winter temperatures that livestock are stabled during the cold weather, and is not practicable throughout the areas under consideration, except to a very minor degree.

(2) The growing of crops, preferably leguminous, to be ploughed into the soil while still green.

This is possible, but, because the land must remain unprofitable while such a crop is grown, and because the actual growing of the crop entails considerable labour and expense, it is not likely to be an economic way of increasing the soil fertility. Incorporating grass and weed growth with the soil, in such a way that the growth is thoroughly covered by the plough when fallowing, is a modification of this practice, and is undoubtedly useful where insufficient livestock are kept to graze down the growth before fallowing.

(3) Changing the farm methods from cereal growing to the keeping of livestock, or a combination of the two, so that the land is not overcropped, but a large proportion of the vegetable matter and the actual plant foods are returned to the soil in the droppings from the livestock.

This is the only manner in which mallee farms may remain profitable, while the drain on humus and soil fertility is checked, and the farm commences to increase in productivity and actual value.

The older countries of the world teach a lesson which should be learnt here concerning soil fertility on farm lands. Areas have been farmed for hundreds of years and are more fertile to-day than formerly. A good farmer makes this his object. It can be calculated almost exactly, if necessary, and provision made always to replace depleted plant foods, and to restore damaged soil condition.

It is certain that many of the cereal-growing methods on Mallee farms in this State are such that in a short period of years the soil will be so depleted that it will be of no further use for agriculture, and of little value as pasture. Farmers should therefore change, as soon as possible, from present methods, and realise that soil and climatic conditions in most Mallee areas will not allow continued narrow cereal-growing rotations, but are suited only for cropping in conjunction with the keeping of livestock.

Livestock on Mallee Farms.

During the recent period of low prices for wheat many farmers have attempted to increase their income by the keeping of different classes of livestock, developing what are known as sidelines. The breeding and management of horses, dairy and beef cattle, pigs, and poultry may be very useful and profitable sidelines, and have proved so on many occasions.

A mistake is made when the keeping of sheep is classed as a sideline. It is not so, but should be one of the two main industries on Mallee farms—wheat and sheep. Probably in the better rainfall parts wheat growing will remain the more important industry of the two, with the sheep becoming increasingly important as the rainfall decreases, until, in some of the low rainfall areas now growing wheat, this will be almost abandoned, and the properties become chiefly pastoral. Considerable adjustment will be necessary, of course, in these low rainfall parts, and in many cases larger areas than those now held are essential.

The majority of Mallee farmers do keep some sheep. In many cases only sufficient are kept to assist in the clearing of fallows, and to serve as a ration flock. In other cases sheep are bought when there is a surplus of feed, and sold when the flush of feed is over. This is often not profitable, as the stock are bought on a rising market and sold on a falling one. Some farmers successfully deal in sheep, but such farmers are exceptional. It must be realised that on a farm a man has not the opportunity to keep in intimate touch with market conditions, and so the buying and selling of sheep flocks may be disastrous.

A much more profitable way is to keep a permanent flock, choosing the type most suited to conditions, and depending for profits on wool and lambs. This is done now by a percentage of the best farmers; the knowledge necessary for efficient management has been gained by them, and can be obtained by others. Even on most of these farms, however, there is considerable room for improvement. The number of sheep kept is usually not sufficient to affect materially the soil condition. To do this effectively it is necessary to keep large numbers of sheep on a comparatively small area, and thus the present stock-carrying capacity of these areas must be increased.

There are several ways in which this can be done, all of which will be dealt with in this article. They are:—

(1) The improvement of existing pasture species, and the encouragement of other and better species by the addition of fertiliser to the soil.

(2) The introduction by seeding of better species.

(3) The growing of cereal or other crops for grazing.

(4) Supplementing the pastures by the use of conserved fodders.

(5) Closer farm subdivision, and better reticulation of water supply.

CHEMICAL ANALYSIS OF PASTURE PLANTS WHICH MAY BE GROWN ON MALLEE FARMS.

In order to obtain a general idea of the relative feeding value of the various plants which may be used as pastures, specimens were obtained, and a chemical analysis made of 25 different species. These include the cereals, also pasture

plants which appear naturally after Mallee land is cleared, together with others which may be introduced with some hope of success.

Thanks are due to Mr. E. M. Hutton, B.Sc. (Agric.), Field Officer, for assistance in obtaining the specimens, and to the Department of Chemistry for the analytical work done.

The specimens were obtained at as near the same stage of growth as possible, the flowering stage being chosen for this purpose, although the wheat, oats, rye, barley, Wimmera rye grass, evening primrose, and lucerne had not quite reached this stage. It is realised that these analyses are only useful to give an approximate idea of the feeding value of each species of plant, and must be used in conjunction with such known facts as relative palatability, comparative growth, and suitability for the area. The different constituents into which the specimens of each species have been divided are:—

Water.

In all growing pasture plants a large percentage of the weight and bulk naturally consists of water. In the species under review the moisture content varies

Sandy soil which needs binding by pasture plants.

from 60 to 90 per cent., although the majority show between 70 to 85 per cent. of water. The water content of growing plants helps to make them succulent, palatable, and easily digested; it also keeps up the moisture content of the animal's body, and to this extent replaces drinking water.

Ash.

The ash is the mineral part of the plant—that which is left after burning. It consists of mixtures of many minerals, those usually present in the greatest quantity being common salt, lime and potash compounds, and phosphates. These minerals are very necessary to the health of farm animals, but only in small quantities, and on most soils are present in the plants grown in sufficient quantities. They are often supplemented, by careful stockowners, with the supply of mineral licks as an adjunct to the food of farm animals.

Several of the specimens analysed show an abnormally high percentage of mineral matter, and it is suggested that possibly the plants obtained included a quantity of earth in the form of fine dust. This, however, would not affect appreciably the value of the analyses.

Fibre.

This part of the plant gives bulk to the food—very necessary, particularly in the case of the ruminant animals, cattle and sheep. It consists of cellulose, and most of it is not digestible, although in reasonable quantities it helps to promote the digestion of the actual food constituents.

The amount of fibre increases as the plant approaches maturity, until in many cases the bulk of fibre left in the residues after the seed has been removed is such that the plant is not relished by stock, and the energy used in digestion is greater than the food value obtained. This is the case with wheaten straw, and probably also with the common grasses of the Mallee. An excess of fibre at any time is likely to make a plant unpalatable to livestock. In the analyses given the plant showing the greatest fibre content is Haresfoot Clover, which is known to be unpalatable. Next in order are Spear Grass, Silver Grass, Barley Grass, and the Brome Grasses, all of which are not relished by stock as they get near full maturity.

Protein.

This is the nutrient which is of most importance, and the one most likely to be deficient in ordinary Mallee pastures. It contains the nitrogen of the food, and as such is used to supply flesh, and all the nitrogenous parts of the body, replacing waste tissue, growing further tissue in young animals, developing the foetus in pregnant stock, stimulating milk secretion in the female after birth of the young, developing the wool of sheep, and when present in greater quantity than necessary for these purposes, providing energy also. Thus breeding and growing stock require a higher protein content in their food than other animals do. For this reason an essential part of good pasture management with stockbreeders is to obtain a mixture of species in the pasture which will provide sufficient protein.

Most grasses are somewhat low in protein content, whereas leguminous plants, as lucerne and the clovers, are relatively high, and therefore the well-balanced pasture should be a mixture of the two. In the building up of stock-carrying capacity on Mallee farms this is a most important point.

Carbohydrates.

These are the starches and sugars of the food, and are for the purpose of supplying heat and energy to the body. When present in greater quantity than is necessary for maintenance they also supply the body with fat. Carbohydrates are as essential as protein, and are necessary in much greater quantities, but are not so likely to be deficient in pasture mixtures in the lower rainfall areas as protein is.

Fats.

The fats are usually present in growing plants only in small percentages, but serve a very useful purpose. They are similar to the starches and sugars in the supply of heat, energy, and fat to the animal, but one unit of fat is considered equivalent to about 2¼ units of carbohydrate.

Only a proportion of the food constituents is actually digested, and the balance not utilized is voided by the animal. For this reason analyses such as these can give no more than an approximate comparison of food values. Where it is possible to ascertain the amount of digestible nutrients, the exact food value can be obtained by calculating all digestible material as starch equivalents, and the

nutrient ratio, showing the comparative value for growing or fattening stock ascertained by the relative proportion of proteins with other food constituents.

The digestible nutrient content can only be obtained by the actual feeding of stock with each food separately, and the amount of protein, carbohydrate, and fat voided by the animal ascertained and subtracted from the total consumed. This has been done elsewhere, though not to any extent in Australia, for most of the common farm foodstuffs, and the results obtained, set out in the form of tables, have usually been accepted here as fairly reliable. It has not been done with most of the pasture species during the growing period. The amount of work involved would be very great, and probably would not be justified by the value of the results obtained, as the majority of stockowners know sufficiently well, by experience, whether their pasture mixture is reasonably well balanced or otherwise.

The value of the present analyses to Mallee farmers mostly lies in demonstrating the fact that many of the species which are in the present natural pastures are deficient in some of the food constituents, chiefly protein; that the leguminous plants show a higher protein content than most others, and therefore that for the development of greater carrying capacity a balanced pasture mixture of legumes with the grass and other herbage is as essential as the provision of greater quantity.

In the early stages of growth nearly all pasture plants will provide a sufficient proportion of all necessary constituents provided enough is available; it is in the later stages that many become deficient.

Individual analyses will be referred to when dealing with the separate species.

CHEMICAL ANALYSES OF PASTURE SPECIES.

Common Name.	Botanical Name.	Protein.	Carbo-Hydrate.	Fat.	Ash.	Fibre.	Water.
Cereals—							
Wheat	—	3·15	9·0	0·9	2·7	5·45	78·8
Oats	—	3·6	7·8	1·2	2·1	3·6	81·7
Barley	—	3·6	6·9	1·2	2·9	4·5	80·9
Rye...............	—	2·6	11·2	1·1	1·3	5·4	78·4
Wild Oats	*Avena fatua*	2·25	13·1	0·8	1·85	6·2	75·8
Grasses—							
Barley Grass	*Hordeum murinum* ...	3·4	10·75	0·85	2·4	8·4	74·2
Silver Grass	*Festuca myuros*	2·2	11·25	0·75	2·3	9·6	73·9
Great Brome Grass .	*Bromus villosus*	2·65	8·15	0·7	2·1	7·1	79·3
Madrid Brome Grass	*Bromus madritensis* ...	2·6	8·3	0·7	2·8	6·9	78·7
Common Spear Grass	*Stipa variabilis*	3·55	13·0	0·9	2·2	10·55	69·8
Wimmera Rye Grass	*Lolium sp.*	2·2	9·5	0·7	6·1	4·5	77·0
Mediterranean Grass	*Schismus calycinus*	4·4	8·2	1·1	20·7	5·4	60·2
Legumes—							
Lucerne	*Medicago sativa*	4·8	8·1	1·1	3·1	5·3	77·6
Burr Medic	*Medicago denticulata* ..	4·25	6·6	1·05	2·8	3·6	81·7
Barrel Medic	*Medicago tribuloides* ...	4·15	6·05	1·0	2·6	3·6	82·6
King Island Melilot	*Melilotus indica*	4·2	8·85	1·0	2·05	3·7	80·2
Clustered Clover ...	*Trifolium glomeratum* .	3·2	8·3	0·9	2·25	4·75	80·6
Hop Clover	*Trifolium procumbens* .	4·35	9·85	1·3	2·15	4·85	77·5
Woolly Clover	*Trifolium tomentosum* .	3·0	5·3	0·7	3·0	2·5	85·5
Hare's Foot Clover..	*Trifolium arvense*	4·8	11·85	1·0	2·5	11·25	68·6
Early Subterranean Clover	*Trifolium subterraneum*	2·6	6·6	0·75	8·75	3·2	78·1
Other Herbage—							
Wild Mustard	*Sisymbrium orientale*...	4·0	6·95	0·7	2·1	5·25	81·0
Evening Primrose ..	*Oenothera odorata*......	2·1	8·2	0·5	8·0	1·7	79·5
Geranium..........	*Erodium moschatum* ...	2·0	6·15	0·75	2·05	2·25	86·8
Cape Dandelion	*Cryptostemma calendulaceum*	1·7	3·8	0·5	2·6	1·5	89·9

Spear Grass (*Stipa variabilis*)

NATURAL PASTURES OF THE MALLEE.

In its natural state, before the scrub is cleared, most Mallee land has practically no stock-carrying capacity. On any belts of plain country, free of timber, species of Spear Grass are often present, and in the lower rainfall areas, in parts, Bluebush and some varieties of Saltbush can be found.

When Mallee scrub areas are leased for pastoral purposes some carrying capacity is obtained by periodical burning of the scrub, which allows further development of Spear Grass, and also makes available for stock the young growing shoots of various bushes. Even under such circumstances only a few sheep per square mile can be carried, and often then there is a definite phosphate deficiency, so that stock cannot safely remain on this country for any length of time.

With the clearing of the land for cultivation the position improves. There often appears to be sufficient Spear Grass seed in the soil to develop plants for a considerable amount of grazing. This persists for a time, but usually is killed right out eventually by cultivation practices. A shrub of the order *Compositae*, commonly called Yellow Daisy, frequently appears. This is a real cultivation weed, and gives considerable trouble to the farmer, until he commences to keep sheep. Sheep evidently relish the weed, and eat it out when young, so that it does not persist.

As cultivation continues, other pasture plants appear and spread, until pastures, at least in the Murray Mallee area, generally contain most of the following plants: Barley Grass, Silver Grass, Brome Grasses, Wild Mustard, Wild Oats, Geranium, Cape Dandelion, and various other species of comparatively minor importance. During the last five or six years another grass—Mediterranean Grass—has appeared, is spreading rapidly, and promises to be an important factor in pastures.

The advantages and disadvantages possessed by these common pasture plants are as follows:—

Spear Grass (*Stipa variabilis*).

This hardy, free-growing grass is common on new land. In the young growing stage it is relished by stock, and according to analysis should be quite a good maintenance and fattening food. As it approaches maturity it becomes tough, fibrous, and unpalatable, so that it provides no good food residue over the summer months. The seed, also, is sharp and spearlike, causing much trouble with sheep, affecting their eyes, and often penetrating wool and skin into the flesh. Spear Grass does not usually persist under ordinary Mallee farming methods, and so is seldom seen on old land.

Barley Grass (*Hordeum murinum*).

This is the most common grass on Mallee farms. It appears naturally, without any seeding, and spreads rapidly, until many of the pastures are practically all Barley Grass. It is quite definitely a cultivation weed, causing considerable trouble on land to be cropped, and usually persisting sufficiently well to form the main pasture again within two years after a cereal crop is grown. During its growing period it appears to provide a reasonably balanced ration, both young and mature stock thriving well on it; the chemical analysis also confirms this. After the flowering stage its period of utility is practically over. The seed is a real menace, causing sore mouths in all classes of livestock, as well as affecting the eyes and penetrating the skin of sheep. Barley Grass germinates quickly after autumn rains, gives good winter feed, but matures very early in the spring, so that the useful period is short. The straw residue, when the seed has shed, is of little food value, and is usually soon blown away after a few windy days, particularly if there should be a fall of rain.

[From "Grasses and Fodder Plants of N.S.W.," E. Breakwell.]

Left—Barley Grass (*Hordeum murinum*). Right—*Hordeum maritinum*. The bunch of flowers at the upper right-hand side of the plate is *H. maritinum*. Note that only the central flower is fully developed.

[From "Grasses and Fodder Plants of N S W," E Breakwell]

Great Brome (*Bromus villosus*) Note the large flowering glume.

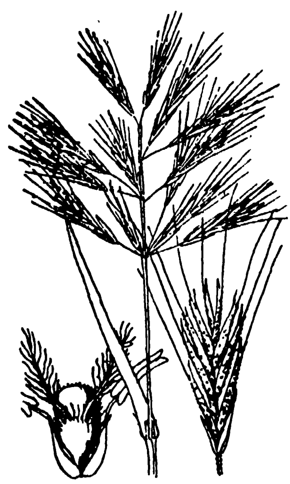
The chief disadvantage of Barley Grass is the fact that it is a common host for the fungus disease Takeall, which undoubtedly is one of the reasons why Takeall remains so serious a disease in wheat crops on Mallee farms. Any system of pasture improvement which will reduce or eliminate Barley Grass is therefore of extreme importance to the wheatgrower.

Silver Grass (*Festuca myuros*).

The majority of Barley Grass pastures contain also a certain amount of Silver Grass. Its season of germination and maturity is similar to that of Barley Grass. It is slender in flag and stem, never providing much bulk of fodder. Silver Grass has no very objectionable features; it may be a host to Takeall, but has never been considered important in this respect. Because of the short growing period, the lack of bulk, and the blowing away of residues after maturity of the plant, Silver Grass, although a good fattening feed for stock, will not be worth a place in improved pastures.

Brome Grasses.

The family of Brome Grasses contains some useful species, including Prairie Grass. Those which grow on Mallee farms in low rainfall country, however, are not so useful. They are the Great Brome (*Bromus villosus*) and Madrid Brome



[From "Black's Flora of S.A."]
Madrid Brome (*Bromus madritensis*).

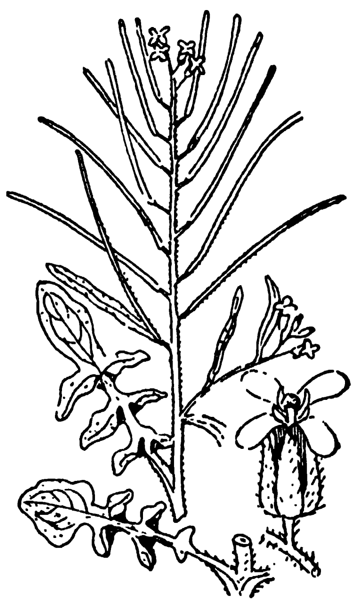
(*Bromus madritensis*). The second of these—Madrid Brome—is not very common It appears occasionally, never being a high percentage of the pasture, is a useful pasture grass during the growing period, but not of great importance so far as Mallee pastures are concerned.

A variation of the Great Brome, which is known as *Bromus rigidus*, is unfortunately becoming very common. Like the other common grasses, it provides reasonably good feed during the growing period, until flowering time. The seed develops on a panicle like the oat plant, and the seed itself is somewhat like an oat grain, but longer, harder, and with very sharp points. It is probably the most dangerous seed of all for damage to eyes, mouths, skin, and flesh of livestock. This grass also, is said to be a host to Takeall. Because of the very objectionable features of the seed of this plant, farmers should make an attempt to eliminate it if possible. This species is erroneously called "Mitchell Grass" by many farmers.

Wild Mustard (*Sisymbrium orientale*).

Wild Mustard is one of the chief cultivation weeds in the Murray Mallee District. It appears on practically all farms, and can be found to some extent in nearly all the cereal crops. It is called "Charlock" by most farmers, but the real Charlock is not at all common in this area.

The seed of Wild Mustard appears to remain in the ground sometimes for long periods without germinating. It is never possible to get a complete germination, successive crops often appearing after each fallow working during autumn months, so that, to the wheatgrower, it has nothing to commend it. From a pastoral point of view this plant is not objectionable. It provides quite good feed during the growing period. The chemical analysis shows a surprisingly high protein content, which would lead to the conclusion that this plant will provide a better balanced



Sisymbrium orientale. (L.) (Wild Mustard.)

ration for growing animals and for milking stock than most of the common pasture plants. This conclusion is confirmed—partially at least—by the experience of many farmers, who are very satisfied with Wild Mustard as a pasture plant. Some go so far as to say that they prefer their hay to contain a proportion of mustard, claiming that, apart from its food value, it acts as a tonic to livestock.

When mature, this plant provides more feed than many others. It is not greatly disturbed by wind or rain, and stock find the seedheads palatable. Probably the passing of mature seed through the livestock is the chief reason why Wild Mustard continues to grow almost everywhere on these Mallee farms.

The greatest disadvantage of Wild Mustard as a pasture is the strong characteristic odour. This gives an unpleasant flavour to milk, all dairy products, and to the flesh of animals killed for meat. The odour does not seem so volatile as some are, and it is difficult to remove from dairy products. If stock for slaughtering, however, are starved from 12 to 24 hours before killing the taint disappears.

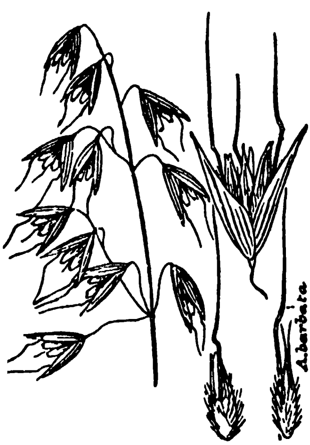
Wild Oats (*Avena fatua*).

This plant is not so common in the newer Mallee areas as in many other wheat-growing districts. It appears gradually, probably commencing when seed or hay is purchased which contains Wild Oat seed as an impurity. It prefers the higher rainfall areas, and in the Murray Mallee is often seen in crops grown in country with from 14in. to 17in. average annual rainfall.

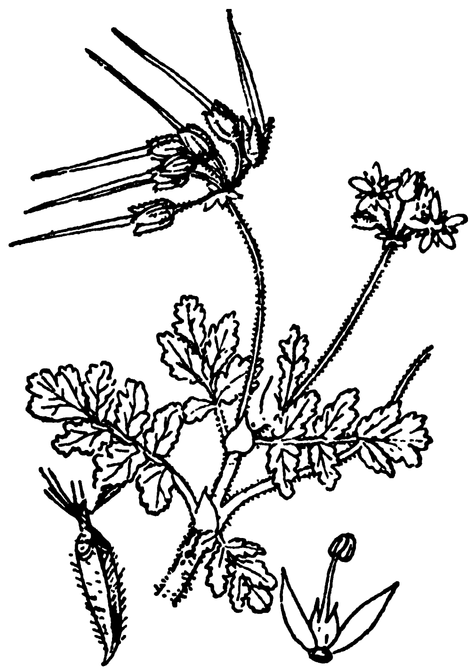
Like Wild Mustard, it is a difficult weed to eradicate on cultivation areas, owing to delayed germination of a proportion of the seed. It cannot be classed as a general pasture plant, as it does not persist on uncultivated areas, except usually for one or two years after a crop has been grown. It is quite a good feed, although more fattening than flesh or milk producing, is palatable to livestock at all stages of growth, and will also, when it grows as a self-sown crop, make good hay if it is cut soon after the flowering stage.

Geranium (*Erodium moschatum*).

Several species—usually called Geranium—grow among the pastures in this area. They are all very similar, and the one named above is the most common.



Wild Oats (*Avena fatua*).
[From "Black's Flora of S.A."]



Geranium (*Erodium moschatum*).

These plants appear usually after the land has been cleared for some time, and after some superphosphate dressings have been applied to cereal crops. With further fertilizer dressings, when leguminous plants are growing freely, the plants of this family become less numerous in the pasture mixture.

The analysis shows a high percentage of moisture, and comparatively low quantities of nutrients. This is confirmed by experience, as these plants are considered only moderately nutritious to stock. In some parts the common name of

Crowsfoot, or Stork's Bill, is given to them, because of the appearance of the seed heads. When the seed heads are mature they each contain several sharp-pointed seeds, attached to long spirally twisted awns. These seeds, with their awn attachments, are among the most dangerous to stock, freely penetrating the skin and piercing the flesh.

[From *Journal of Agriculture*, Western Australia.]

Cape Weed (*Cryptostemma calendulaceum*).
A—Portion of flowering plant. B—Leaf. C—Flower head. D—Ray flower centre of head. E—Flower from centre of head.

Cape Dandelion (*Cryptostemma calendulaceum*).

This weed is known to some farmers simply as Dandelion, and to others as Cape Weed. As another plant, from Europe, is also commonly known as the Dandelion, the name of Cape Dandelion is more suitable for this one, which came to Aus-

tralia in 1833 from South Africa. It is one of the chief cultivation weeds, and is very difficult to eradicate from fallow land unless destroyed when the plants are small seedlings, especially in wet seasons. The plant is very tenacious of life, and even when uprooted by the cultivator, will re-establish itself unless warm days or frosty nights kill it.

In areas with 14in. or more annual rainfall the Cape Dandelion destroys a considerable amount of cereal crop, as its habit of spreading over the ground tends to choke out all other growth. It germinates freely early in the autumn, and because of this often provides the first green pick for livestock, so that it is useful in this respect.

The analysis shows a higher percentage of moisture than for any other plant with very low percentages of all useful food constituents. This is confirmed by experience, Cape Dandelion being well known as a soft, watery food, of little value to livestock, except when in a mixture with better plants, and which also reaches maturity early in the spring, leaving no pasture residue. It persists on pasture land, unless methods are adopted to encourage the leguminous plants, when it can be reduced or eliminated. Cape Dandelion does not grow to any extent where rainfalls are less than 12in. to 13in. per annum.

Mediterranean Grass (*Schismus calycinus*).

Mediterranean Grass is a newcomer to the Murray Mallee area. It has been known for a considerable period in Central Australia, to which it was apparently introduced accidentally in the packing of camel saddles, brought by Afghans from the Mediterranean region, where it is a native grass.

It was first seen in the Murray Mallee about the year 1930, and the most reasonable theory is that the seed, which is very small and light, was wind-carried in duststorms during the drought periods of 1927 and 1929. Appearing first as single plants, it spread very rapidly, especially through the lower rainfall parts. It can now be found in all parts of the district, and over large areas of low rainfall country is rapidly replacing all other pasture plants, especially Barley Grass.

It has been stated that the grass is of low feeding value. This is not confirmed by either the chemical analysis or the experience of farmers. Although the sample obtained for analysis by the writer evidently included much dirt—shown by the ridiculously high ash percentage—there is a very satisfactory quantity of all plant nutrients, particularly of protein. The grass grows only a few inches in height stooling very freely, and stockowners state that it is palatable to all classes of livestock at all stages of growth.

It has no objectionable features, except as a cultivation weed on fallow, and although only an annual, maturing fairly early, the root system apparently remains alive for some time after the plant produces seed, and it will develop fresh growth if rains fall late in the spring. Although the residue after maturity is light, it is freely eaten by stock.

The chief plant being replaced by Mediterranean Grass is Barley Grass, and experience to date is that the replacement is beneficial, and will mean some increase in stock-carrying capacity, particularly in areas of low rainfall—from 9in. to 12in.—where any definite system of pasture improvement is difficult. Another common name given to this plant is Kelch Grass.

(*To be continued.*)

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. Clarke, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 13—BUFFALO BURR.

Solanum rostratum, Dunal.

The name "Buffalo Burr" is probably due to the frequent occurrence of this plant, in former times, around the so-called "buffalo wallows" and other bare places on the western plains of North America, which is its native home. *Solanum rostratum* is a well-known plant in the United States, throughout which country it has gradually spread as a weed in an easterly direction, and from which it has been brought both to Europe and to Australia. The first record of its occurrence in this country was at Boggabri, New South Wales, in 1904, but it is now to be found in all States of the Commonwealth with the exception of Tasmania. It appears to follow the wheat belt and doubtless owes its introduction to impure seed wheat or other grain. Fortunately it is not very common in this State, only an occasional plant being found, here and there, in settled districts. Buffalo Burr has been declared noxious for the entire State, the main objections to it being its prickly nature and its free seeding qualities. For these reasons it should be destroyed wherever found, otherwise it is liable to contaminate seed, and thus to be spread extensively throughout agricultural lands.

In appearance Buffalo Burr is somewhat similar to the closely related Apple of Sodom (*S. sodomaeum*) which we have already described in this *Journal* (Vol. XXXVII., No. 8, p. 1015, March 1934). The resemblance is most marked in the form of the leaves and the distribution of the prickles. But it differs from the Apple of Sodom in a number of characters. Unlike the latter *Solanum rostratum* is annual, not perennial in its habit, and the flowers are yellow instead of purple or white. Moreover, the plant is of a greyish colour due to the presence of a felt-like covering of star-shaped hairs, and the berries are comparatively small and remain enclosed within the prickly calyces of the fruits.

Botanical Name and Classification.—The botanical name of the genus, and the characters, both of the genus *Solanum* and of the family *Solanaceae,* were dealt with in the article on the Apple of Sodom referred to above. The species named *rostratum* means "beaked," and is due to the fact that one of the five stamens of the flower is longer than the rest and has an incurved beak. Other characters which distinguish *S. rostratum* from other species of *Solanum* are the yellow flowers, the tomentum or felt-like covering of stellate hairs, and the enlarged prickly calyx which encloses the berry fruit.

Botanical Description.—An herbaceous annual, becoming woody when old, 8in. to 2ft. tall, the entire plant covered with a greyish stellate tomentum, the stems and branches bearing yellow prickles which become less numerous on the leaves; leaves ovate or oblong, stalked, 1in. to 3in. long, the blade irregularly pinnate or 1- to 3-pinnatifid, with obtuse undulate lobes. Inflorescence cymose but appearing racemose; cymes stalked; flowers yellow; calyx of five sepals, the lobes longer than the prickly tube, enlarging in the fruit and enclosing the globular berry, the prickles becoming very long and dense; corolla tomentose outside, about 1in. across, with long lanceolate lobes of which one is much longer than the others; stamens five, one anther longer than the other four, and with an incurved beak; berry globular, about ½in. in diameter, containing numerous dark minutely pitted seeds.

Properties.—Buffalo Burr is not a very common weed in this State, but it is an entirely useless plant and, in view of its prickly nature, is to be placed in the same category of undesirable weeds as the thistles and other plants causing injury to stock. These qualities, taken in conjunction with the readiness with which it forms large amounts of seed, justify its inclusion among the noxious weeds proclaimed for the entire State. It is a much wiser policy to regard a

[After J H Maiden, Some Weeds of New South Wales "]

Buffalo Burr (*Solanum rostratum Dunal*)

A—Imperfectly expanded flower, showing the beaked stamen to which the plant owes its specific name B and C—Two seeds, greatly enlarged. D—Flower, showing the cluster of prickles under the calyx.

new weed as being possibly harmful before it has secured a firm foothold, than to wait until it has become firmly established throughout the State before taking active measures against it. An ideal list of noxious weeds would be a list of very rare plants. While this, unfortunately, is very far from being the state of affairs with most of the weeds declared noxious in the State, there are at least a few which, like Buffalo Burr, do not appear to be of very frequent occurrence.

Dried specimen of Buffalo Burr Note prickles on stems, and the burr-like fruits.

Eradication.—Since the plant is an annual its eradication does not present serious difficulties. Prevention of seed formation being the essential method of dealing with weeds of this type, any plants that appear should be hoed out as soon as possible. Such active measures combined with regular and periodic inspection of all areas likely to harbour noxious weeds should be an effective means of preventing the growth and spread of Buffalo Burr.

A REVIEW OF THE TOBACCO GROWING INDUSTRY IN SOUTH AUSTRALIA.

[By R. E. Courthope Giles, Tobacco Instructor, Department of Agriculture, Adelaide.]

The past year has been a very trying one for tobacco growers throughout Australia. South Australia in common with the other States of the Commonwealth has suffered from unseasonable weather conditions and the most serious outbreak of Blue Mould disease that has ever been experienced.

Owing to the extreme heat and lengthy drought of the early part of last year, the crops reaped were particularly light.

Buying operations were conducted through the State during October and November last. In the South-Eastern areas, 277 bales of leaf were purchased from growers, the approximate total weight being 55,400lbs. Of this amount, 40,000lbs. were of the 1933-34 season's growth, and 15,400lbs. of reordered leaf, left over from the previous season.

Buyers rejected 137 bales of mouldy and inferior dark leaf, 90 of which had been carried over from previous years.

The quality of the leaf in the different localities varied considerably, the most satisfactory results being obtained in the Coonawarra and Comaum areas, where 3s. per lb. and over was obtained for the best grades, and as much as 3s. 5d. per lb. was paid for Bright Mahogany Leaf.

Throughout the South-East, the average price was only 1s. 9d. per lb. owing to the fact that a considerable quantity of short inferior light and Mahogany Leaf was purchased in the Penola area.

The Penola leaf suffered to a greater extent from the severe drought than was the case in other parts of the South-East. The rejected bales contained very inferior and immature leaf, for which there was no demand.

In the Adelaide Hills, 266 bales were purchased from growers, and the prices obtained were on a par with those ruling in the South-East, but the final results were not quite so satisfactory. A considerable quantity of the leaf offered had been roughly handled and broken, and in a number of cases insufficient care had been taken with the grading and preparation for sale.

Dark leaf grown in the vicinity of Mount Barker, and on patches of heavy ground in other parts of the Adelaide Hills proved to be unsaleable. In the past, during the tobacco boom period, quite a number of people grew leaf on soil totally unsuited for the production of the bright cigarette type, which is necessary to meet modern requirements.

The falling off in the demand for dark tobacco, and the consequent drop in prices has forced a number of growers to abandon tobacco growing entirely, or to transfer their activities to more suitable localities. To-day, with one or two minor exceptions, it can safely be said that growers are now established upon the right type of soil.

In areas where the rainfall is low—during the growing period of the plant, between November and February—some form of irrigation is necessary and growers have been advised accordingly.

EXPERIMENTAL WORK.

Plots were established with growers in the South-East, Adelaide Hills and Barmera and Berri districts in the Murray Irrigation Areas with the object of ascertaining the most suitable varieties for these districts. Clean seed of all the well known Virginian types was supplied to the State by the Council for Scientific and Industrial Research and tried out under constant supervision.

Unfortunately, Downy Mildew or Blue Mould disease has been particularly bad this season in the South-East and Adelaide Hills, and nullified a number of experiments from a purely varietal point of view, but from the disease resistance aspect, very satisfactory results were obtained. Dungowan and Spotted Gum appeared to be less susceptible to infection from mould, and made remarkable recovery in the field when control methods were adopted.

In the Murray Irrigation Areas, Hickory Pryor gave best results, but the majority of species did well where conditions were suitable, with proper cultiva-

Dungowan and Spotted Gum Varieties.—Grown by Messrs. Johnson Bros., Comaum.

tion, irrigation, and protection from the high winds that prevail in these localities. Seedlings grew remarkably well with but little attention and remained free from infection from Blue Mould even when taken to affected plantations in the Adelaide Hills, and they have since reached maturity.

In the South-East, in one instance, a grower lost his first planting of Hickory Pryor and White Stem Orinoco from Blue Mould. After thoroughly re-working his land, he planted for the second time, with the only healthy seedlings to be found in the district, namely: Dungowan and Spotted Gum. The crop was put out into the field at the end of November, and is yielding over 1,000lbs. of excellent leaf per acre.

Fertilizer trials were conducted upon the Experimental Plots, which proved conclusively the superiority of a complete manure for the production of bright tobacco upon the light soils in this State. The best results were obtained with the 3-8-3 mixture, containing Nitrogen, Phosphoric Acid, and Potash, plus 2 per cent. of Magnesia.

"BLUE MOULD."

The problem now facing tobacco growers in South Australia is that of the Blue Mould or Downy Mildew disease, which is undoubtedly the principal obstacle in the way of the establishment of a most promising industry.

The Commonwealth Council for Scientific and Industrial Research has been actively engaged in this matter for some considerable time, and it is hoped that some methods of prevention or cure will soon be discovered.

The disease made its appearance early in the current season—at the commencement of the field planting operations—with disastrous consequences to the crop in the South-East, particularly in the vicinity of Adelaide.

In the former locality, field control methods were more successfully carried out, and with the aid of clean seedlings obtained from outside sources, crops above the average quality are being cured.

Unfortunately, re-planting in the Adelaide Hills area was impossible, as adequate supplies of clean seedlings were unobtainable. For this reason, crops are very light, and in several cases, growers suffered a complete loss.

Every endeavour will be made by the Department of Agriculture to ensure a sufficiency of disease-free seedlings being available in the forthcoming season, by means of production in dry areas, and with the use of hot beds of the Bathurst type.

With the object of eradicating all known sources of infection from Blue Mould as far as possible, the Tobacco Industry Protection Act of 1934 was passed by the State Legislature in November last. Regulations under this Act have recently been gazetted, and growers will be well advised to note their contents, a precis of which is given hereunder:—

1. Every grower of tobacco who harvests seed for sale should notify the Director of Agriculture in Adelaide immediately, and prior to the harvesting of such seed.
2. Every person growing tobacco seedlings for sale must notify the Director within one calendar month of commencing to do so.
3. Any person who fails to notify the Director as laid down in Regulation No. 2 must give at least four days notice to the Director prior to any sale or disposal of seedlings being made.

A penalty not exceeding £5 can be imposed for a breach of these regulations.

Furthermore, the Act provides that old tobacco plants other than those portions which have been harvested must be destroyed by fire or burial before the 31st day of July in each year.

Owing to the prevalence of Blue Mould among tobacco crops during the current season, the last-mentioned provisions will be rigorously enforced, and proceedings will be instituted under the Act against offenders.

In conclusion, one can only hope that the endeavours of South Australian tobacco growers will be amply rewarded, as they deserve. They are pioneering a new industry in the State, in the face of considerable difficulties. This industry is of great financial benefit to the Commonwealth and supplies an avenue of employment, and a further source of income to owners of land, which could not be more profitably utilised, once the menace of Blue Mould has finally been disposed of.

VITAMINS.

[Their Practical Application to the Feeding of Livestock.]

Mr. Alan H. Robin, B.V.Sc., Government Veterinary Officer of the Stock and Brands Department, replying to the question, "What are Vitamins and their practical application to the feeding of livestock?" which was submitted at the South-Eastern Bureau Conference said:—Natural foodstuffs contain, in addition to proteins, carbohydrates, fats and mineral salts, minute amounts of certain substances or food factors which are essential for health and normal growth. These are known as Vitamins. Up to the present time, some 8 or 9 different ones are known and it is possible that as research work on them progresses, this number may be added to.

Unlike the better known constitutuents of foods, viz, proteins &c., Vitamins do not supply energy or constructive material for the formation of body tissue, but they exert an exceedingly tremendous influence on the nutritive processes of the body and a lack of them in the diet leads to general unthriftiness and definite symptoms of various "deficiency" diseases.

Our knowledge of the Vitamin requirements of farm stock is still rather incomplete, but investigational work that has so far been done in this connection indicates that Vitamin C (which prevents or cures Scurvy in human beings, monkeys and guinea pigs), is of no great practical importance to them—all classes appear to be able to get along quite well without it.

Cattle and sheep have been shown to suffer no ill effects from a shortage of the "B" group of Vitamins, lack of which causes Beri-Beri in man. Poultry are very susceptible to "Beri-Beri." I cannot find any records of any tests done on horses and pigs for these Vitamins. "B" group Vitamins are, however, so widely distributed in foodstuffs extensively used in farm stock feeding, *e.g.*, wheat offals, cereal grains, grasses, most hays, greenfeed, silage, milk, &c., that there is a very little likelihood of any shortage occurring in any ordinary ration that might be used.

Whether or not a deficiency of Vitamin "E" (which causes Sterility in rats), affects reproduction in farm stock is not known as no experiments have been carried out. This Vitamin also is widely distributed in foodstuffs, *e.g.*, grasses, wheat, bran, milk, so that under ordinary conditions a marked deficiency of it is unlikely to occur in farm stock rations.

Vitamin "A" which promotes growth and Vitamin "D" which controls the metabolism of calcium and phosphorous and promotes healthy growth of bone are of the greatest importance to farm stock, and a deficiency of them leads to disorders such as stunted growth, general unthriftiness, paralysis and rickets. Young pigs confined to sties and fed on cereals, young poultry kept on the intensive system without green feed, and calves, if kept in sheds and fed on artificial foods, are all very liable to suffer from these disorders, especially if the premises in which they are kept confined do not admit direct sunlight.

Two most potent sources of Vitamins "A" and "D" are green feed and good quality Cod Liver Oil and a supply of these in the rations of young stock being held in confinement is of very definite value in keeping them free of these diseases.

Direct sunlight is also a rich source of Vitamin "D" and exposure to it is often as valuable as feeding substances rich in this Vitamin.

Our present knowledge of Vitamins in relation to farm stock would therefore indicate that, so long as the stockowner exposes his stock to direct sunlight as much as possible and feeds them on a mixed and varied diet, including green feed, he need not concern himself much about the matter of Vitamins—the stock will get all they require of them.

With young stock being kept in confinement, especially if away from direct sunlight, consideration must be given to the matter ensuring them an adequacy of Vitamins "A" and "D" which can most readily be supplied in green feed and/or Cod Liver Oil. The dose of Cod Liver Oil is for large animals 1 dessertspoonful a day; (for poultry) 4ozs. for each 10lbs. of mash.

SULPHURING VINES.

[*"Is the effect of sulphur dusting during the ripening period of currant and wine grapes beneficial for early ripening and sugar content; if so, the best method to apply?"*]

Mr. A. G. Strickland, M.Sc. (Deputy Chief Horticultural Instructor), in replying to the above question, which was submitted at the Lower North Bureau Conference, said dusting with dry sulphur for the purpose of controlling the fungus disease, odium of the vine, seems to have been first proposed by an English gardener, named Kyle, in 1846. In the early fifties of the nineteenth century the use of sulphur as a specific against oidium was in general use throughout France, and right to the present day sulphuring has been regarded as standard treatment for oidium.

Under the climatic conditions which prevail in most of the vine-growing areas in South Australia, oidium has not constituted a major problem, and although it was customary to use sulphur as a routine vineyard practice in South Australian vineyards some 30 or 40 years ago, the practice is not nearly so general to-day.

In addition to its fungicidal action in controlling oidium, several authorities have claimed other advantages to accrue from regular sulphuring. In brief, sulphuring is claimed by these people to affect vegetation beneficially, increasing vigour, and imparting to the vine, darker green foliage, and generally more healthy appearance.

Furthermore, sulphuring whilst the vines are in bloom is claimed to lessen "coulure," or the tendency which certain varieties have of dropping their blooms without setting. Whether this is due to direct stimulation of the floral organs by sulphur, or due merely to the mechanical action of the draught caused during sulphuring and the impact of sulphur particles on blooms has never been worked out.

The third indirect advantage claimed to result from regular sulphuring is a hastening of ripening. A French writer, Mares, claimed vintages to have become some 12 days earlier under the influence of sulphuring, and in support of this contention gave a list of vintage dates from 1838-1863.

In spite of these generalised statements regarding the beneficial effects of sulphuring other than control of oidium, there is little or no direct experimental evidence to support the statements. Under dull, cloudy and sultry conditions, which favour the spread and development of oidium, there is no doubt of the benefits derived from sulphuring; but under conditions where oidium is not troublesome, it is doubtful whether the claims made for sulphur are always fully realised. In regard to the improved setting of grape varieties liable to faulty setting, claimed to result from sulphuring, it is interesting to note recent American work on the effect of sulphur fungicides applied during bloom on the set of apple fruits. Sulphur applied as a dust or lime-sulphur spray, either before pollination or shortly afterwards, definitely reduced the set of fruits. Admittedly, we cannot strictly compare the setting of grapes and the setting of apples, but it is, nevertheless, interesting to record this finding.

In regard to the claim of earlier ripening, we are again faced with a general statement without any supporting figures, other than those recorded by Mares from 1838-1863.

In the light of present knowledge, the matter may be summed up as follows:—

1. Where and when climatic conditions favour the spread and development of oidium, definite advantages should accrue from the application of sulphur to vines.

2. Where oidium is not a serious problem, there is a modicum of evidence that sulphuring may—

(a) Improve general health and vigour of vines.

(b) Improve setting in the case of vine sorts subject to "coulure."

(c) Result in slightly earlier maturity of the grapes.

Under different growing conditions, on different soils, and in different districts the above effects, (a), (b), and (c), may vary considerably in intensity, and in few instances would it seem that the cost of sulphuring would be justified, unless used as a specific against oidium.

In conclusion, it should be remarked that there is justification for careful experimentation, with a view to determining just how important sulphuring is in the matter of improving health of vines, improving setting, and advancing maturity of the fruit.

"KITCHEN" REMEDIES FOR COMMON AILMENTS OF THE HORSE.

The Hon. Secretary of the Pinkawillinie Branch of the Agricultural Bureau who asked for "Kitchen remedies for common ailments of the horse" has been supplied with the following information by Mr. Alan H. Robin, B.V.Sc., of the Stock and Brands Department:—

Sand in Horses.—Give a drench of 1 (one) pint of new milk, 1lb. of honey or treacle; or raw linseed oil 1½-2 pints, turpentine 4 (four) tablespoonfuls. Follow with drenches once or twice daily of 1 (one) quart of strong black coffee.

Blood Worms.—Starve animal for 24-30 hours and then give drench of raw linseed oil 1½-2 pints, turpentine 4 tablespoonfuls. Subsequently give 1 tablespoonful of Fowler's solution of arsenic in damped feed night and morning for a fortnight. Repeat the whole treatment after an interval of 3-4 weeks.

Colic (spasmodic and flatulent).—At outset give drench of raw linseed oil 1½-2 pints, turpentine 4 tablespoonfuls, scrubbing (or cloudy) ammonia 2 tablespoons. Subsequently, as necessary, give every two to three hours a drench of 1 tablespoon of scrubbing (or cloudy) ammonia in 1 quart of thin gruel. Supplement above medicinal treatment by giving enemas of warm soapy water. "Backrake" the animal first and then inject 3galls. to 4galls. of solution slowly through a short length (6ft.) of old hose or ½in. to ¾in. rubber tubing. Repeat the enemas every three or four hours.

Strangles.—Isolate animal in warm, airy quarters. Keep nostrils free of discharge by sponging out with tepid water every three to four hours. Give inhalations of steam medicated with a little eucalyptus or turpentine. Apply hot water foments frequently to swelling under jaw till abscess ripens. Then lance and subsequently irrigate out abscess cavity once or twice daily with weak antiseptic solution (2 per cent. to 3 per cent. lysol or "vetonza," etc.). Water animal from bucket and give 1oz. of ordinary photographer's "hypo" daily dissolved in the drinking water.

Simple Colds.—Isolate and treat as for strangles (excepting that there is no swelling under jaw to be treated).

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	1	9	
	2	4	
B. Cooke,	3	12	25
Kanmantoo.	4	5	
	5	5	
	6	11	21
			46
	7	—	
	8	—	
	9	—	—
	10	—	
	11	—	
	12	—	—
			—
	13	4	
	14	—	
A. H. Matthews, ...	15	12	16
Bridgewater	16	10	
	17	19	
	18	6	35
			51
	19	2	
	20	8	
H. F. Muirson,	21	7	17
Yundi.	22	6	
	23	8	
	24	15	29
			46
	25	15	
	26	17	
E. McKee,	27	16	48
5, Rose Street,	28	14	
Carrondown.	29	16	
	30	10	40
			88
	31	—	
	32	11	
H. C. Stacy,	33	13	24
Meadows.	34	—	
	35	5	
	36	16	21
			45
	37	—	
	38	3	
T. Cleaver,	39	6	9
Bridgewater.	40	7	
	41	3	
	42	3	13
			22
	43	1	
	44	—	
	45	11	12
C. Sandstrom,	46	5	
Yundi.	47	3	
	48	14	22
			34
	49	1	
	50	9	
A. J. Monkhouse,	51	11	21
Woodside.	52	12	
	53	6	
	54	1	19
			40
	55	15	
	56	16	
J. F. Smith,	57	7	38
Meadows.	58	6	
	59	2	
	60	10	18
			56
	61	18	
	62	4	
A. Young,	63	13	35
Bridgewater.	64	—	
	65	9	
	66	7	16
			51
	67	9	
	68	7	
R. W. McAlister,	69	9	25
Yundi.	70	4	
	71	4	
	72	14	22
			47
	73	16	
	74	17	
T. Duhring,	75	15	48
Mallala.	76	1	
	77	12	
	78	12	25
			73
	79	4	
	80	5	
R. J. Underdown,	81	10	19
Meadows.	82	2	
	83	14	
	84	12	28
			47
	85	5	
	86	5	
S. Hill,	87	11	21
Bridgewater.	88	13	
	89	15	
	90	6	34
			55
	91	—	
	92	7	
W. R. Hedger,	93	6	13
Yundi.	94	4	
	95	1	
	96	5	10
			23

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	97	4	
	98	4	
Langmaid & Bettison,	99	—	8
Salisbury.	100	—	—
	101	1	
	102	—	1
			9
	103	16	
	104	5	
E. Portlock,	105	10	31
Meadows.	106	8	
	107	8	
	108	15	31
			62
	109	11	
	110	5	
Murray Powell,	111	8	24
Jupiter Creek.	112	10	
	113	20	
	114	9	39
			63
	115	14	
	116	11	
G. W. Bignell,	117	3	28
Meadows.	118	—	
	119	7	
	120	6	13
			41
	121	13	
	122	11	
	123	—	24
W. M. Field,	124	3	
Yundi.	125	5	
	126	12	20
			44
	127	7	
	128	9	
	129	18	34
C. R. Wharton,	130	12	
Meadows.	131	15	
	132	17	44
			78
	133	18	
	134	14	
	135	19	51
H. H. Hefford,	136	—	
Murray Bridge.	137	16	
	138	6	22
			73
	139	8	
	140	1	
	141	2	11
F. W. Gage,	142	8	
Meadows.	143	1	
	144	7	16
			27
	145	14	
	146	8	
	147	6	28
W. H. L. Norman,	148	8	
Echunga.	149	1	
	150		28
			56

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	151	11	
	152	1	
	153	9	21
B. R. Whittington,	154	7	
Yundi.	155	13	
	156	6	26
			47
	157	13	
	158	17	
	159	8	38
B. C. Sanders,	160	14	
Meadows.	161	—	
	162	7	21
			59
	163	—	
	164	6	
	165	14	20
H. H. Gallagher,	166	1	
Pooraka.	167	5	
	168	5	11
			31
	169	17	
	170	—	
	171	3	20
W. Sickert,	172	8	
Meadows.	173	10	
	174	9	27
			47
	175	—	
	176	—	
	177	13	13
W. Restall,	178	14	
Echunga.	179	1	
	180	15	30
			43
	181	14	
	182	—	
A. G. Dawes,	183	2	16
230, Portrush Road,	184	—	
Glenunga.	185	9	
	186	8	17
			33
	187	9	
	188	5	
	189	11	25
G. W. Sykes,	190	4	
Yundi.	191	6	
	192	10	20
			45
	193	13	
	194	15	
	195	9	37
R. Bartley,	196	8	
Meadows.	197	13	
	198	11	32
			69
	199	3	
	200	2	
A. & H. Gurr,	201	7	12
Mindaroo Poultry Farm,	202	11	
Bradbury.	203	1	
	204	1	13
			25

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	205	13	
	206	13	
	207	16	42
J. J. Devlin,	208	15	
Meadows.	209	3	
	210	14	32
			74
	211	15	
	212	8	
	213	7	30
D. J. Foxwell,	214	—	
Echunga.	215	15	
	216	3	18
			48
	217	6	
	218	2	
	219	20	28
F. J. Buck,	220	13	
Meadows.	221	10	
	222	1	24
			52
	223	2	
	224	—	
	225	10	12
J. A. Grist,	226	2	
Yundi.	227	4	
	228	8	14
			26
	229	13	
	230	12	
	231	5	30
L. A. King,	232	—	
Meadows.	233	16	
	234	3	19
			49
	235	4	
	236	5	
	237	4	13
R. W. Sando,	238	8	
Echunga.	239	7	
	240	1	16
			29
	241	11	
	242	10	
	243	6	27
E. W. Young,	244	2	
Meadows.	245	—	2
	246	—	—
			29
	247	7	
	248	6	
	249	—	13
A. Jarvis,	250	6	
Yundi.	251	9	
	252	16	31
			44
	253	2	
	254	3	
	255	—	5
	256	2	
	257	3	
	258	2	7
			12
	259	4	
	260	5	
	261	5	14
S. Bridge,	262	5	
Yundi.	263	9	
	264	—	14
			28
	265	9	
	266	17	
	267	8	34
H. G. Egarr,	268	8	
Meadows.	269	9	
	270	2	19
			53
	271	10	
	272	11	
	273	6	27
R. H. Smith,	274	15	
Yundi.	275	5	
	276	10	30
			57
	277	10	
	278	12	
	279	16	38
J. M. Lawson,	280	6	
Meadows.	281	13	
	282	5	24
			62
	283	5	
	284	4	
	285	2	11
J. O. Marshall,	286	13	
Yundi.	287	10	
	288	5	28
			39
	289	11	
	290	18	
	291	2	31
G. Joyce,	292	15	
Meadows.	293	17	
	294	15	47
			78
	295	1	
J. A. Bradtke,	296	2	
Yongala.	297	6	
		9	
	298	15	
W. H. A. Hodgson,	299	17	
Salisbury.	300	16	
		48	
	301	4	
A. W. McDonald,	302	7	
Gawler.	303	9	
		20	
	304	12	
J. H. Dowling,	305	14	
Glossop.	306	1	
		27	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	307	10	
A. P. Urlwin,	308	8	
Balaklava.	309	5	
		23	
	310	5	
L. S. Ekers,	311	3	
Mount Compass.	312	8	
		16	
	313	6	
V. E. Williams,	314	8	
Semaphore Park.	315	4	
		18	
	316	8	
F. P. Munzberg,	317	6	
Tanunda.	318	3	
		17	
Total Class 1		2,434	

Class 2—Any Other Light Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	319	8	
Langmaid & Bettison,	320	8	
Salisbury.	321	10	
(Black Minorcas.)		26	
	322	4	
A. Heaysman,	323	17	
Government Road,	324	14	
Eden Hills.			
(Cuckoo Leghorns.)		35	
Total Class No. 2.		61	

Class No. 3—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	325	9	
	326	9	
	327	21	39
A. G. Dawes, 230,	328	14	
Portrush Road,	329	2	
Glenunga.	330	7	23
			62
	331	3	
	332	13	
	333		16
H. J. Mills,	334	3	
108, Edward Street,	335	6	
Edwardstown.	336	3	12
			28
	337	10	
	338	2	
	339	7	19
K. Pennack,	340	8	
Pooraka	341	14	
	342	—	22
			41
	343	9	
	344	3	
	345	16	28
H. H. Gallagher,	346	6	
Pooraka.	347	2	
	348	—	8
			36
	349	—	
B. Cooke,	350	2	
Kanmantoo.	351	—	
		2	
	352	13	
H. H. Hefford,	353	—	
Murray Bridge.	354	—	
		13	
J. H. Dowling,	355	—	
Glossop.	356	2	
	357	6	
		8	
L. S. Ekers,	358	6	
Mount Compass.	359	3	
	360	5	
		14	
	452	1	
	453	—	
A. G. Dawes,	454	—	
230, Portrush Road,			
Glenunga.		1	
	455	—	
	456	—	
	457	—	
		1	
A. P. Urlwin,	465	3	
Balaklava.	466	—	
	467	8	
		11	
Total Class No. 3		216	

Class No. 4—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	361	—	
	362	—	
H. J. Mills,	363	—	
108, Edward Street,		—	
Edwardstown.		—	
(Rhode Island Reds.)	364	20	
	365	6	
	366		
		26	
	367	—	
	368	2	
A. G. Dawes,	369	—	2
230, Portrush Road,	370	1	
Glenunga.	371	—	
(Rhode Island Reds.)	372	—	1
			3
	373	3	
	374	10	
F. F. Welford,	375	10	23
1, Ludgate Circus,	376	1	
Colonel Light Gardens.	377	1	
(Rhode Island Reds.)	378	—	2
			25
	379	-	
	380	12	
V. F. Gameau,	381	12	24
Findon Road,	382	13	
Woodville.	383	—	
(Rhode Island Reds.)	384	—	13
			37

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
	385	—	
	386	10	
K. Pennack, Pooraka. (Barnevelders.)	387	13	23
	388	—	
	389	1	
	390	17	18
			41
	458	2	
	459	5	
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	460	2	9
	461	—	
	462	—	
	463	—	—
			9
Total Class No. 4			141

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs.	
	391	5	
	392	9	
G. R. Cowell, Balhannah.	393	7	21
	394	1	
	395	1	
	396	5	7
			28
	397	6	
	398	10	
A. J. Monkhouse, Woodside.	399	4	20
	400	2	
	401	8	
	402	3	13
			33
	403	2	
	404	1	
G. R. Cowell, Balhannah.	405	1	4
	406	7	
	407	5	
	408	4	16
			20
Total Class No. 5			81

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs.
W. R. Christie, Upper Mitcham.	409	8
	410	—
	411	—
		8
Total Class No. 7		8

Class No. 8.—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs.
W. R. Christie, Upper Mitcham. (Rhode Island Reds.)	412	5
	413	10
	414	9
		24
Total Class No. 8		24

SECTION 3.—WET MASH.

Home Project Utility Section.—Any Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.
Peter Western, Ascot Park School. (White Leghorn.)	415	15
Peter Western, Ascot Park School. (White Leghorn.)	416	15
William Sando, Echunga School. (White Leghorn.)	417	10
Douglas Marshall, Yundi School. (White Leghorn.)	418	9
Norman Page, Murray Bridge School. (White Leghorn.)	419	4
Kelvyn & Brian Nicholls, Finniss School. (White Leghorn.)	420	8
Dean Colwell, Grange School (White Leghorn.)	421	8
Warren Hannaford, Paracombe School. (White Leghorn.)	422	5
W. Horne, Woodville School. (White Leghorn.)	423	10
Owen Robinson, Ascot Park School. (White Leghorn.)	424	9
June Chapman, Woodchester School. (White Leghorn.)	425	2
Rosa Hunt, Morphett Vale School. (White Leghorn.)	426	—
Jack O'Sullivan, Morphett Vale School. (White Leghorn.)	427	7
Peter Taylor, Morphett Vale School. (White Leghorn.)	428	3
James Taylor, Morphett Vale School. (White Leghorn.)	429	2
William Gregory, Victor Harbour School. (White Leghorn.)	430	—
Ian Bruce, McLaren Flat School. (White Leghorn.)	431	5
Clifford Burford, Smithfield School. (White Leghorn.)	432	1
Tom Callaghan, Smithfield School. (White Leghorn.)	433	—
Eric Pratt, Abattoirs School. (White Leghorn.)	434	15
Stanley Pratt, Abattoirs School. (White Leghorn.)	435	14
Alan Yelland, Cunliffe School. (Minorca.)	436	1
Gordon Gallasch, Gilles Plains School. (White Leghorn.)	437	—

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.
Clarence King, Tarlee School. (White Leghorn.)	438	—
Olive Pitman, Gilles Plains School. (Black Orpington.)	439	18
Donald Heading, Sturt School. (Black Orpington.)	440	5
Clive Steer, Sturt School. (Black Orpington.)	441	3
Herbert Oliver, McLaren Vale School. (Black Orpington.)	442	14
Lyol Stone, Morphett Vale School. (Black Orpington.)	443	13
Ray Candy. Noarlunga School. (Black Orpington.)	444	1
Malcolm Booth, Bridgewater School. (Black Orpington.)	445	4
Murray Heneker and Frank Short, Hamley Bridge School. (Black Orpington.)	446	3
Peter Boucaut, Seaton Park School. (Rhode Island Red.)	447	—
Peter Preece, Gilles Plains School. (Rhode Island Red.)	448	3
Cliff Crosser, Wellington Road School. (White Leghorn.)	449	12
John Keldoulis, Orroroo School. (Black Orpington.)	450	—
Bruce Dooland, Thebarton School. (Black Orpington.)	451	—
Alan Yelland, Cunliffe School. (Rhode Island Red.)	464	2
Total		221

FEEDING TESTS AT PARAFIELD POULTRY STATION.

[New Series of Tests by C. F. ANDERSON, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April to 30th April.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal; 2ozs. wheat per day.
2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.
3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.
4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.
5. Commencing with a crushed barley and crushed wheat mash, greenfeed, meatmeal and then the feeding to be changed according to the season of the year.

Feeding test scores 1st April, 1935, *to 30th April,* 1935.

Test.	Eggs Laid.		Total.
	1⅞oz. and over.	Under 1⅞ozs.	
1	343	114	457
2	300	158	458
3	332	86	418
4	258	92	350
5	215	102	317

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED 28TH APRIL, 1935.— FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird No.
Singles—		
M. Powell	20	113
F. J. Buck	20	219
A. H. Matthews	19	17
Trios—		
H. H. Hefford	51	133–135
E. McKee	48	25– 27
T. Duhring	48	73– 75
W. H. A. Hodgson	48	298–300
Teams—		
E. McKee	88	25– 30
C. R. Wharton	78	127–132
G. Joyce	78	289–294

Class No. 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	17	323

Class No. 3.—Black Orpingtons.

Singles—		
A. G. Dawes	21	327
H. H. Gallagher	16	345
Trios—		
A. G. Dawes	39	325–327
H. H. Gallagher	28	343–345
A. G. Dawes	23	328–330
Teams—		
A. G. Dawes	62	325–330
K. Pennack	41	337–342
H. J. Mills	28	331–336

Class 4.—Any other Heavy Breed.

Singles—		
H. J. Mills	20	364
K. Pennack	17	390
Trios—		
H. J. Mills (Rhode Island Red)	26	364–366
V. F. Gameau (Rhode Island Red)	24	379–381
Teams—		
K. Pennack (Barnevelders)	41	385–390
V. F. Gameau (Rhode Island Reds)	37	379–384

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Singles—		
A. J. Monkhouse	10	398
G. R. Cowell	9	392
Trios—		
G. R. Cowell	21	391–393
A. J. Monkhouse	20	397–399
Teams—		
A. J. Monkhouse	33	397–402
G. R. Cowell	28	391–396

Class No. 7.—Black Orpingtons.

Singles—

W. R. Christie	8	409

Class No. 8.—And other Heavy Breed.

W. R. Christie	10	413

SECTION 3.—WET MASH.

Home Project Utility Section.—Any Breed.

Singles—

Olive Pitman, Gilles Plains School (Black Orpington)	18	439
Peter Western, Ascot Park School (White Leghorn)	15	415
Peter Western, Ascot Park School (White Leghorn)	15	416
Eric Pratt, Abattoirs School (White Leghorn)	15	434

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow July to March.	Per Herd during March.	Per Cow during March.	Per Cow July to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H	10	9·19	5,041	504·10	4,403·51	239·82	23·98	210·92	4·76
7/L	33	26·39	9,332½	282·80	4,678·26	445·28	13·49	206·89	4·77
7/P	26·48	20·13	9,583½	361·91	4,972·76	425·66	16·07	238·21	4·44
7/AA	25	14·55	3,991½	159·66	4,502·61	218·28	8·73	205·69	5·47
7/TT	17	15·32	7,443½	437·85	6,034·76	308·85	18·17	263·51	4·15
7/UU	28·97	9·06	2,260	80·13	3,535·47	95·45	3·38	151·47	4·22
7/XX	23	20·61	10,038	436·44	5,423·26	547·23	23·80	290·45	5·50
7/BBB	74·79	58·39	25,335½	338·75	4,673·41	1,092·57	14·61	206·99	4·31
7/CCC	25	21·13	7,649½	305·98	4,316·52	321·56	12·86	187·29	4·20
7/DDD	13	12	6,029½	463·81	5,141·71	271·43	20·88	246·80	4·50
7/EEE	10·71	8·74	4,311	402·51	4,885·39	213·10	19·89	246·54	4·94
7/GGG	17·81	11·97	4,484½	251·79	3,030·32	199·64	11·21	137·89	4·45
7/HHH	12	9·77	2,874½	239·54	5,303·18	101·81	8·48	187·57	3·54
7/III	16	13	5,564½	347·78	5,728·09	182·80	11·43	201·16	3·28
7/JJJ	12·35	5·45	1,865½	151·05	3,328·77	79·44	6·43	158·54	4·26
7/KKK	30	22·45	6,357½	211·92	4,312·66	318·51	10·62	216·50	5·01
7/LLL	18	15·77	6,621½	367·86	5,039·50	348·41	19·36	268·97	5·26
7/MMM	15	12·52	5,775½	385·00	3,897·70	299·82	19·99	201·48	5·19
Means	22·67	17·02	6,919·94	305·21	4,586·59	317·20	13·99	210·65	4·58

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow December to March.	Per Herd during March.	Per Cow during March.	Per Cow December to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	18	11·65	2,212	122·89	1,007·80	140·82	7·82	54·55	6·37
6/C	17·77	11·35	5,134½	288·94	1,920·60	268·77	15·12	83·58	5·23
6/Y	13	12·35	6,525½	501·96	1,881·67	278·93	21·46	78·90	4·27
6/FF	27	25·65	13,282	491·93	2,959·50	618·33	22·90	122·85	4·66
6/II	18	18	15,267½	848·19	2,702·22	625·43	34·75	112·77	4·10
6/KK	20	17·55	9,447	472·35	2,073·18	370·98	18·55	77·74	3·93
6/LL	25	19·84	10,829½	433·18	2,317·90	447·59	17·90	85·18	4·13
6/OO	17·52	14·74	10,025½	596·15	2,717·85	420·49	25·04	114·97	4·19
6/SS	16	16	12,400	775·00	3,167·96	485·33	30·33	121·92	3·91
6/TT	23·23	21·23	1,8367½	790·67	2,816·42	780·85	33·60	115·74	4·25
6/VV	26	23·71	16,184½	622·48	2,993·82	807·61	31·06	135·80	4·99
6/XX	26·45	24·23	15,858½	599·56	2,952·45	674·59	25·50	120·17	4·25
6/CCC	25·97	22·03	9,968	383·84	1,943·76	425·84	16·40	85·10	4·27
6/DDD	26	20·97	13,104	504·00	2,289·62	555·52	21·37	102·28	4·24
6/JJJ	24·87	20·74	14,545½	584·86	2,614·53	691·88	27·82	122·53	4·76
6/NNN	36·55	32·58	20,408½	558·87	2,535·14	953·77	26·09	110·91	4·67
Means	22·59	19·54	12,097·50	535·64	2,477·63	534·17	23·65	105·19	4·42

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow October to March.	Per Herd during March.	Per Cow during March.	Per Cow October to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	30·26	15·61	10,092½	333·51	2,424·49	513·61	16·97	126·30	5·09
5/D ..	28·58	14·13	6,624	232·00	2,589·33	360·12	12·58	138·75	5·43
5/E ..	37·03	27·84	10,477½	282·92	2,961·80	569·08	15·37	149·89	5·44
5/R ..	69	52·10	15,087	218·65	2,418·16	664·63	9·63	108·31	4·41
5/Ee .	22·29	22·26	9,238½	414·46	3,306·49	481·72	21·61	166·45	5·21
5/Z ..	32·13	27·55	21,309½	663·23	4,019·52	1,116·17	34·74	203·76	5·24
5/Kk	14	13	7,967	569·07	3,960·13	388·52	27·75	184·75	4·88
5/Ww	20	8·65	3,036	151·80	2,279·76	157·57	7·88	110·23	5·19
5/Xx	22	11·74	4,198	190·82	2,759·59	244·55	11·12	147·12	5·83
5/Yy	11	6·65	2,342	212·91	2,413·99	128·65	11·70	120·44	5·49
5/Aaa	17·65	13·26	4,369½	247·56	2,814·48	220·51	12·49	138·29	5·02
5/Bbb	17·87	14·45	3,322½	185·92	2,467·97	162·23	9·08	122·39	4·88
5/Ddd	26·65	24·26	19,218	721·12	4,766·70	866·72	32·52	192·41	4·51
5/Eee	21·13	19·45	12,102	572·73	3,811·58	531·97	25·18	170·81	4·40
5/Fff	9	3·32	649	72·11	2,913·12	36·83	4·09	134·26	5·67
5/Ggg	9·97	8·97	2,884½	289·32	3,047·08	140·93	14·14	139·39	4·89
5/Hhh	16·45	15·42	7,240	440·12	3,840 67	291·25	17·71	152 96	4·02
5/Iii .	17	16·94	8,092	476·00	—	465·69	27·39	—	5·75
5/Jjj	21	7·19	3,784½	180·21	—	178·21	8·49	—	4·71
Means	23·32	16 99	8,001·79	343·18	3,020·69	395·73	16 97	144·50	4·95

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during March.	Per Cow during March.	Per Herd during March.	Per Cow during March.	
			Lbs.	Lbs.	Lbs.	Lbs.	%
9/A.	30	22·71	11,589	386·30	552·74	18·42	4·77
9/C.	11·84	10·39	5,645	476·76	239·05	20·19	4·23
9/D	29·87	25·52	15,175½	508·04	768·13	25·72	5·06
9/E	12	12	5,797	483·08	260·34	21·70	4·49
9/F	16	11·16	3,881½	242·59	178·26	11·14	4·59
9/G	27	26·16	14,039	519·96	697·75	25·84	4·97
9/I	30	19·90	5,801½	193·38	284·79	9·49	4·91
9/J	19·87	11·32	4,237	213·23	175·43	8·83	4·14
9/L	29·65	12·52	5,776½	194·82	241·41	8·14	4·18
9/O	23	19·52	8,930	388·26	388·10	16·87	4·35
9/P	45	13·23	2,634	58·53	145·40	3·23	5·52
9/T	18·65	12·82	4,089½	219·27	184·44	9·89	4·51
9/W	29	23·19	11,348½	391·33	455·78	15·72	4·02
9/X	10·55	8·94	3,120	295·73	156·73	14·85	5·02
9/Y	9·03	5·39	2,952	326·89	119·91	13·28	4·06
9/Z.	9·19	6·19	2,340½	254·68	111·12	12·09	4·75
9/Aa	16	8·35	3,063½	191·46	158·65	9·92	5·18
Means	21·57	14·64	6,495·29	301·16	301·06	13·96	4·64

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on March 27th, there being present Messrs. R. H. Martin (Vice-Chairman), A. M. Dawkins, J. W. Sandford, S. Shepherd, H. N. Wicks, J. B. Murdoch, Hon. A. L. McEwin, M.L.C., Professor A. J. Perkins, Dr. A. E. V. Richardson, H. C. Pritchard (Secretary). Apologies were received from Messrs. A. J. Cooke, F. Coleman, and P. J. Baily.

Advisory Council of Education.—The Registrar of the Advisory Council of Education intimated that Professor Richardson (representing the Advisory Board) had been appointed as a Member of the Council for three years as from January 1st, 1935.

Sales Tax on Lubricating Oils, &c.—Eyre's Peninsula Conferences asked for the abolition of the sales tax on oils and greases when purchased for the production of farm power, or for use on agricultural machinery. The Prime Minister had informed the Premier that the claims had been listed for the consideration of the Government in connection with any sales tax remissions which the Government might be in a position to grant at some later date.

Wireless Talks.—Resolution of the Redhill Conference (Women's Branch)—"That this Conference after a lengthy discussion desires a broadcast talk once a month on the activity of Women's Branches, and on subjects of interest to the members in general." The Secretary was instructed to discuss the matter with the Director of Education.

Life Member.—The name of Mr. H. T. Martin, of the Inman Valley Branch, was added to the roll of Life Members of the Agricultural Bureau.

New Branches.—Approval was given to the formation of a Women's Branch at Tweedvale, with the following foundation members:—Mesdames C. Reuter, F. Schapel, O. Pfeiffer, E. Miller, — McHugh, R. Muster, J. T. Stevens, Misses R. Bretag, F. Stevens, M. and F. Erdman, M. and E. Pfeiffer, V. Muster, and W. Schapel.

Conditional approval was given for the formation of a Branch at Baroota.

New Members.—The following names were added to the rolls of existing Branches:—Mangalo Women's—Miss M. Klingberg; Balhannah Women's—Mrs. D. Kelsey; Petina—J. W. Smith; Buchanan—H. Marschall; Milang—R. Tuckwell, H. L. Morris; Monarto South Women's—Mrs. A. P. Braendler, Miss V. Hartmann; Wasleys Women's—Miss J. Siebert, Mrs. Congdon; Maltee—K. A. Talbot, M. J. Martin; Parilla Women's—Mrs. Mitchell, Mrs. C. O'Loughlin; Saddleworth—R. Robins, R. E. J. Miller; Inman Valley—R. C. Watson; Lipson—E. Treasure; Boor's Plains Women's—Mrs. H. Harris, Miss L. Harris, Miss G. Chynoweth; Balhannah Women's—Miss T. Peacock, Miss C. Pitt; Lone Gum and Monash—E. Docking; Wirrabara Women's—Mrs. W. Noblet, Mrs. C. H. Curnow; Wepowie—W. E. Koch; Tintinara—J. Murphy, R. H. Salmon, A. Prosser, R. Smith, D. Lang; Beetaloo Valley—L. McGinty; Arthurton—D. Henderson; Coonalpyn—W. Videon, J. Carswell, F. Quinton Watson; Monarto South—C. D. White; Kangarilla—Eric Gould; Wilmington Women's—Mrs. H. Carter (foundation member).

Mr. Shepherd gave an interesting talk on his recent trip overseas.

At the meeting held on April 24th there were present Messrs. A. M. Dawkins (Acting Chairman), P. J. Baily, F. Coleman, J. B. Murdoch, A. J. A. Koch, Hon. A. L. McEwin, M.L.C., Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary). Apologies were received from Messrs. A. J. Cooke, R. H. Martin, and Professor Perkins.

Life Member.—The name of Mr. G. A. Stephens, of the Wilmington Branch, was added to the list of life members of the Agricultural Bureau.

New Branches.—Approval was given to the formation of Branches at Narridy (Women's) and Baroota, with the following foundation members:—*Narridy* (Women's)—Mesdames A. E. Klingner, M. Reynolds, J. Liddle, M. O. Smart, T. Welbourne, E. E. Richards, L. R. Nicolson, J. W. Eagle, W. J. Button, L. Baker, A. E.

and P. H. Smart, R. Darley, Misses F. Sandow, K. Mannix, O. and E. Sandow, S. and M. Price, M. Baker, M. Liddle, P. Jenkins, N. Darley, B. J. Reynolds; *Baroota*—Messrs. S. G. Stone, E. G. Mudge, O. T. Hobart, A. Baker, W. H. and J. E. Spencer, H. H. Jaffrey, H. V. Walter, C., C. R, and W. H. Mudge, W. J., F. J., and W. A. McDougall, E. W. Hulster, J. M. Hillam, E. B. Coe, W. Dahlenburg.

Conditional approval was given for the formation of Branches at Carey's Gully, Chapman's Bore, and Whitwarta.

Branches to be Closed.—It was decided to close the Everard East and Uraidla and Summertown Branches.

New Members.—The following names were added to the rolls of existing Branches:—Allandale East—E. L. Carlin, R. M. Hastings, jun.; Belalie Women's—Mrs. Walker, Mrs. S. B. Opie; Kybybolite Women's—Miss H. I. Rowe; Laura—A. Morgan; Maltee—T. Bassham, H. Box; Maltee Women's—Mrs. E. Cunningham, Mrs. R. Oswald; Mudamuckla—J. H. Martin, F. Heller; Murray Bridge—E. W. Mewett; Murraytown—G. Woolford; Penwortham—L. Wyman; Pinbong—W. Kempster; Pinnaroo Women's—Mrs. A. J. Dodman, Mrs. A. B. Chambers; Snowtown Women's—Mrs. A. H. White; Taplan Women's—Miss Ivy Moffatt, Miss G. Clark, Miss N. Condon; Tarlee—R. E. Clarke; Truro—T. E. Rosenzweig, R. K. Butler, O. W. Church; Wandearah—L. A. Jacobs; Warramboo—M. Dorward; Wasleys—O. A. Benger; Wilmington Women's—Mrs. A. J. Noll; Yundi—J. J. Guincy.

At both meetings several items were taken in committee.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE AT MOUNT GAMBIER.

Mr. A. J. Hemming, Chairman of the Mount Gambier Branch of the Agricultural Bureau, presided at the Annual Conference which was held at Mount Gambier on 10th April. Delegates were present from Kybybolite, Kalangadoo, Tantanoola, Allandale East, Penola, Coonawarra, Kongorong, Millicent, and Mount Gambier.

Mr. S. Shepherd (member of the Advisory Board of Agriculture), Dr. A. R. Callaghan (Principal Roseworthy College), Messrs. R. C. Scott (Supervisor of Experimental Work), L. J. Cook (Manager Kybybolite Experimental Farm), C. A. Goddard (Assistant Wool Instructor, School of Mines), E. S. Alcock, W. H. Downes, A. L. Warren (District Agricultural Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary) attended on behalf of the Department of Agriculture.

Conference discussed questions relating to pasture management, dairying, &c., and the following papers were read:—"Mineral Elements in the Diet of Livestock," Mr. A. C. McMillan (Mount Gambier); "Hints to Young Farmers," Mr. W. L. Barrows (Mount Gambier); "Rearing Fat Lambs for Export on Subterranean Clover Pastures," Mr. L. J. Cook (Kybybolite).

It was decided that the 1936 Conference should be held at Kybybolite. On the motion of Mr. J. Laslett (Allandale East), seconded by Mr. W. Griffin, it was resolved "That all resolutions carried at Conferences relating to subject matter for Congress be placed on the Congress agenda."

Mr. E. Gaffney (Coonawarra) moved and Mr. E. G. Allder (Coonawarra) seconded, "In view of the fact that the Minister of Agriculture has refused to appoint veterinary officers in country districts, the Department of Agriculture be asked to pay mileage to private practitioners pending other arrangements being made to appoint veterinary surgeons." The motion was carried.

At the evening session Dr. Callaghan delivered an address, illustrated by lantern slides, "The Conservation of Fodder."

There was a large attendance of Bureau members and their friends at the tour of inspection of Wood's Point, which was held in lieu of a Conference, on 21st February, by courtesy of Messrs. H. W. Morphett & Co., and under the auspices of the Jervois Branch. At various places of interest addresses on topical subjects were given by Messrs. R. C. Scott (Supervisor of Experimental Work), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Poultry Expert), and H. C. Trumble (Waite Agricultural Research Institute). The above is a photo. of the party listening to the address by [illegible] Anderson, given through a microphone and amplifier. In the evening Mr. C. T. [illegible] (Stock and Brands Department) spoke in the Murray Bridge Institute on [illegible] of Stock."

THE STATE EXPERIMENT ORCHARD, COROMANDEL VALLEY, NEAR BLACKWOOD, SOUTH AUSTRALIA.

[By Geo. Quinn, Chief Horticultural Instructor.]

(*Continued from page* 1124.)

THE ROOT SYSTEMS OF VARIOUS ROOTSTOCKS FOR CHERRIES.

With a view to endeavouring to ascertain whether this stagnation and decline could in any way be attributable to root deficiencies, the root system of one typical tree of the same variety growing on each of the rootstocks was investigated in the following manner:—

An area of ground 10ft. x 8ft. 8in. was marked out on the downhill side of the tree. This extended 5ft. on each side of the centre of the tree trunk in the alignment of the row of trees growing on the rootstock in question. At this distance, it turned down the slope at right angles for 8ft. 8in.—equalling half the distance between the rows of trees. These two points were joined up with a line parallel to the first line, thus completing the rectangle, having an area of 26⅔ square feet.

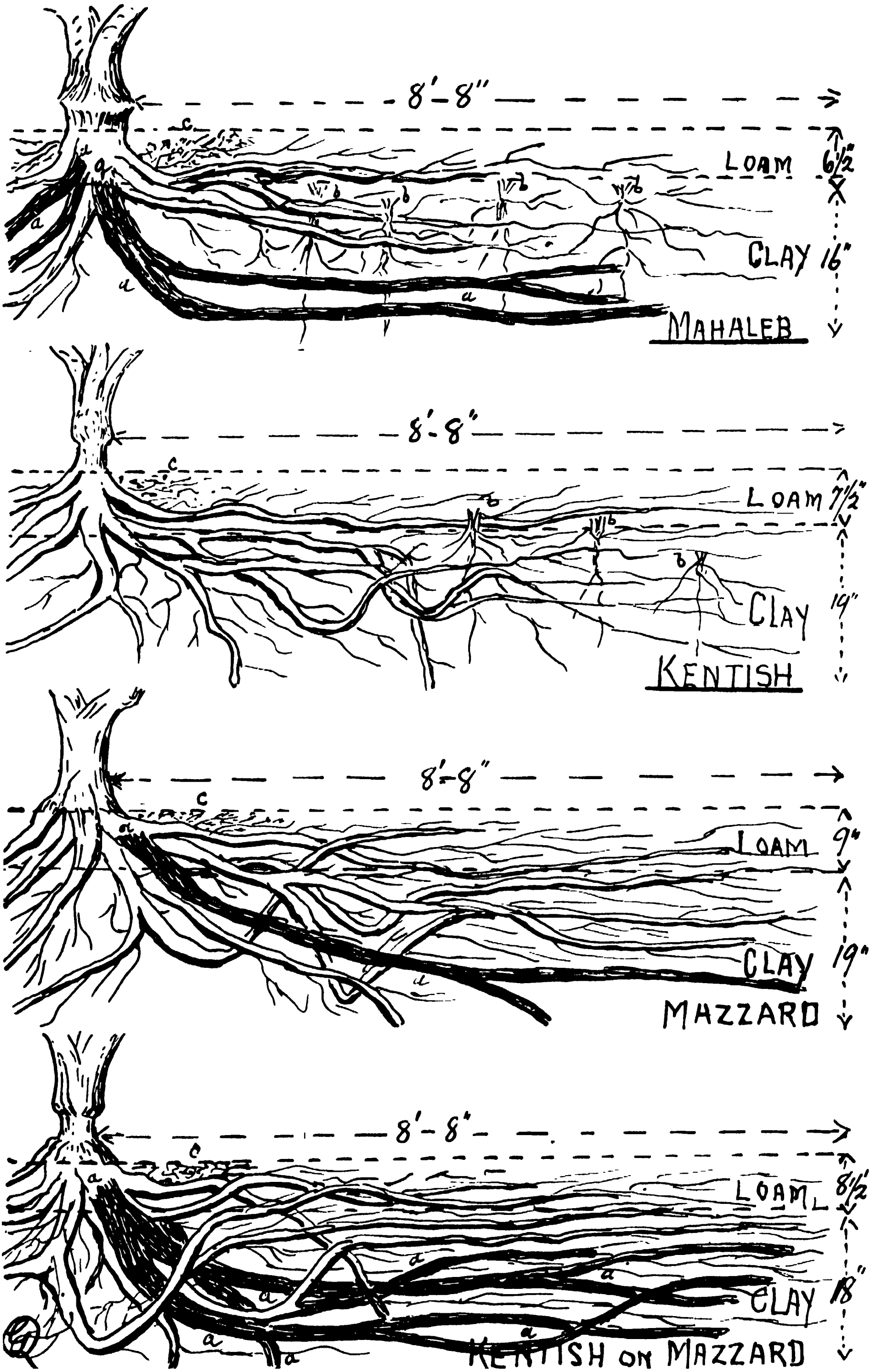
At the outer extremity of the area, a trench 18in. in width was opened until it had been sunk below evidences of root penetration. Any roots, if found coming from the trees in the next or lower row, were separated and cut away. A sketch was then made of the roots coming from within the area to be excavated and where they were more than about 1 cm.—⅜ths of an inch—in diameter, they were measured and a note made to that effect, and of the depth below ground surface at which they were traversing the soil, was also recorded. They were then cut away at the inner bark of the trench, and placed in the shade in groups separated out as:—

(1) Slender roots not over 3mm. in diameter, including fine fibres.
(2) All living roots above 3mm. thick.
(3) Roots of all sizes arising from the bases of suckers, and separate from the tree's root system.
(4) All dead roots.

The excavation was thus continued back towards the tree stem, taking 18in. widths in each step. This was continued up to the alignment of the centre of the tree's trunk. The roots were reasonably cleaned of soil, and then taken away to the work room, and weighed in their separate sections. The weather being cool and cloudy, without any perceptible wind, they did not appear to dry up to any serious extent.

The Mahaleb Root System.

It was found in excavating that the Mahaleb had at some time given rise to a fair number of suckers, which had been constantly held in subjection by the tillage operations, and though not showing above ground at all at the time of removal, were mostly still alive. They had formed a knotted centre from which roots had freely grown. Usually, the deepest and most directly descending fine roots were attached to these suckers and some went almost straight down for a depth of 29in. through the plastic clay layer into the fine marl or decomposed slate. The bark of the roots of the Mahaleb has a pale creamy brown colour, as if stained with clay. The tree on this stock had no large roots in the outer trenches of the area, but a fair number of long slender ones ramified the soil about 6in. or 7in. below the surface—just below the plough depth, but in the loamy surface soil. This class of root was found sparingly running in a horizontal direction about another 6in. deeper in the clay. Very few



Semi diagrammatic representations of the root systems of the various rootstocks in vertical section.

(a) Large dead roots (heavily shaded). (b) Suppressed suckers. (c) Massed fibrous roots.

roots of any kind had penetrated below approximately 16in. from the ground surface. About half-way across the excavated area several large dead roots were unearthed; these measured 3 cm.—1¼in.—in diameter, and were lying about 14in. deep. These had evidently been dead some years, as they were quite readily pulverised when handled. These were eventually traced back to the base of the tree stem, showing increased size as they were unearthed. Above where they joined the trunk, a new layer of large roots had emerged, evidently after the decease of the first lot. These large dead roots were presumably the original anchoring roots thrust down to the depth the land had been loosened and aerated during subsoiling operations. It is possible their decline was the cause of the trees failing to maintain their vigour of growth. As 1923 was the wettest and longest winter recorded at the Orchard, when even some peach trees were destroyed by soil stagnation on the same slope, it is, therefore, quite possible that these main roots of the cherry trees also perished about that time. The fact that similar types of main roots were found to have died on

[*E. W. Pritchard, Photo.*]

St. Margaret's on Mahaleb rootstock.

the Mazzard and combination rootstocks, lends some force to this contention.

An excavation made under the bole of the tree under description revealed the absence of deep descending large roots of any kind, and further tunnelling showed that the other large dead roots radiated from the bole on the uphill side of the tree stem.

The weights of roots excavated, as seen in Table C, and the sectional sketches in side elevation included herewith, show what a very poor root system this rootstock had maintained during recent years. Quite close to the junctions of the larger living roots with the stem, masses of almost wool-like fibrous roots were present in the undisturbed soil. This feature was also common to all of the other rootstocks which were excavated out in a similar manner.

It must be admitted that in excavating roots from a plastic, toughish clay, many of the ends of fine roots were broken off and retained in the small lumps of clay in spite of the workmen's efforts entirely to recover all roots. These are of greater importance to the plant than their insig-

nificant weights would imply, and consequently, some of the value attached to the weights of roots produced is stultified by their absence. At any rate, one may assume that as all the excavations were made in similar clay, and all visible roots and pieces of roots were collected, the losses may be taken to have approximated closely in respect of each kind of rootstock.

The Kentish Root System.

This root system displayed much greater development in proportion to the dimensions of the top growth of the variety it carried than could be attributed to the Mahaleb.

At the outer margin of the most distant trench opened, a good, even fringe of small slender roots was in evidence. These roots were mostly running in the base of the 7½in. depth of loam, and about 5in. below surface level. At 6ft. from the tree stem, practically no roots were found deeper than 14in. down, and these lower ones were traversing a stiff red clay. At

[*E. W. Pritchard, Photo.*]
Bigarreau Napoleon on Kentish rootstock.

4ft. from the tree, that part of the open trench showed a regular distribution of roots as thick as a small finger, and occasionally one dipped down through the clay to a depth of 27in. A little nearer, larger or main roots were met at depths from 13in. to 19in. These, with few exceptions, were running almost horizontally, but near to the tree bole several dipped steeply through the clay into the soft shale. These roots approximated between an inch and an inch and a half in diameter. No direct taproot nor vertically descending main roots were found beneath the bole of the tree. No dead roots of any appreciable size whatever were in evidence in this root system. It was extremely healthy, and shallowly, but evenly, distributed. Contrary to expectations, the evidences of suckering were not abundant and the tillage had evidently eliminated the host of suckers originally to be seen every year arising for some distance around the trees worked on this stock. With half the area given up to its root system excavated, this tree could be swayed or shaken indicating that on the uphill side its root grip in the soil was not equal to that which it had in the

excavated area. The colour of the outer bark of the roots of this stock is very dark—almost black when damp; beneath this epidermal skin a layer of almost bright crimson coloured inner bark is met. This was a most noticeable and distinguishing feature when cutting and separating the roots from those coming into the excavated area from trees on the other rootstocks.

The Mazzard Root System.

This root system as revealed in the tree grown directly on the Mazzard rootstock as well as that whereon the Kentish stem piece had been inserted between rootstock and scion is outstandingly strong and far reaching. At the outer margin of the excavated area—8ft. 8in. from the trunk—roots ranging from 15 mm. to 23 mm.—three-fifths to nine-tenths of an inch—

[*E. W. Pritchard, Photo.*]

Early Purple Guigne on Kentish rootstock.

in diameter were freely distributed along the 10ft. of trench. One of these was dead right back to the bole of the tree. This was apparently also one of the original main roots and it had travelled almost horizontally in the stiff clay at a depth of 16in. from the surface. The layer of surface loam is approximately 9in. thick here, and most of the very numerous smaller slender roots were found from 8in. to 10in. down, indicating that they relished the clay less. The larger roots, from 3 cm. to 7 cm.—approximately 1⅕in. to 2⅘in. in diameter—where they emerged from the bole were numerous, and well distributed.

Some of the smaller roots on this particular tree displayed peculiar bulbous enlargements, resembling the tuberous roots of the dahlia. These are not characteristic of the cherry tree root, and were evidently due to some specific, irritating organism in the soil. A glance at the sketches of these root systems will reveal a pecular characteristic displayed by the stronger roots of the Mazzard rootstock, in that whilst they appear to possess great penetrating power in so far as the stiff clay is concerned, there is a tendency on the part of these deep roots to turn and ascend nearer to the surface when the solidity or non-aerated character of the subsoil increases beyond those powers of penetration. The excavators repeatedly uncovered these knee-like root formations on this rootstock in such circumstances. The colour tone of the outer bark of the Mazzard roots is light brown, the sub-epidermal layer displaying a pale pinkish

shade. An excavation beneath the bole of this tree showed strong, healthy anchoring roots arising all around it, but no defined taproot. After the excavation had been completed, it gave no evidence of "rocking" when a strong workman tried to sway it.

The Mazzard root system of the Kentish-Mazzard combination stock resembled in its distribution and volume of roots the last-named rootstock.

At the extremity of the area, however, the face of the original trench revealed several large roots, having diameters from ¾in. to 1¼in., all quite dead and decayed. The subsequent excavating showed that these were in most, but not all instances, dead right back to the bole of the tree. Slightly above or between the points of attachment of these dead roots a lot of new main roots had developed from the stock. These measured between 2 cm. to 7 cm. (¾in. to 2¾in.) in diameter. This power of regeneration of its root system possessed by the Mazzard rootstock has evidently saved these trees from declining, and possibly dying, after the collapse of the original main roots took place. Most of these large living roots, after dipping down into the very dark-red and stiff clay, and turning up again, travelled through the loamy soil at about 7in. to 13in. below the surface of the land. Several dipped almost vertically and did not turn back. One of these was followed down 26in., and severed there, showing a diameter of 3½ cm., say, 1⅜in. thick. A vast number of thin long roots—under 2 mm. thick—spread away from the branches of these larger roots. These latter, when severed at the boundary of the excavation—5ft. from the trunk on either side—gauged from 2 cm. to 3½ cm. (¾in. to 1⅜in.) in diameter. No taproot was present beneath the bole of this tree, but large living roots had emerged from it on the uphill side, and it still retained an unshakable grip in the soil after being practically deprived of half of its root system. It will be seen from the figures in Table C showing the weights of roots excavated from an area measuring 10ft. x 8ft. 8in. situated on the lower side of each tree, growing on a different stock, that the greatest weight of dead roots was taken from a tree on the Kentish-Mazzard combination. Although this tree made a fine recovery, and never at any time, showed signs of actual distress, it would be of interest to know whether the insertion of the Kentish stem piece between the Mazzard root and the scion variety was in any manner conducive to the death of a larger proportion of the original main roots. From the fine healthy appearance displayed by this and all of the trees of the same and other varieties grown in this row—all of the stocks of which have been built up of the same component parts—one may express doubts as to holding the Kentish stem piece responsible.

TABLE C.—*Showing Weights of Roots Produced by Various Rootstocks in an Area of Land Measuring* 10*ft.* × 8*ft.* 8*in. by approximately* 20*in. deep.*

Types of Roots.	Mahaleb.		Rootstocks. Kentish.		Rootstocks. Mazzard.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
Diameter of 3mm. and under, including fibres	2	2½	6	13½	6	0	5	0
Roots above 3mm. in diameter	8	14	26	14½	46	0	34	5
Roots from suckers	2	0	0	0¾	—		—	
Dead roots	13	12	—		1	7½	15	3
Total weight of all roots	26	12½	33	12¾	53	7½	54	8
Living roots	13	0½	33	12¾	52	0	39	5

INFLUENCE ON CROPPING AND QUALITY OF FRUIT.

The accompanying Table D indicates that the few first cherries borne by these trees were recorded in 1916—six years after the stocks were planted out "in dormant bud." These were collected from the Early Lyons and Early Purple Guigne varieties. It is pointed out that the greater proportion of this extremely small harvesting came from trees of these sorts worked on Mahaleb and Kentish rootstocks, but the trees budded on Mazzard, and the Kentish-Mazzard combination stocks also contributed some fruit from the Early Lyons variety. There is, however, no evidence that the use of the intervening piece of stem from the dwarfing (Kentish) cherry has been conducive to earlier cropping than where the scion variety has been joined directly on to the Mazzard rootstock.

In explanation of the somewhat patchy character of the yields recorded year by year from this plot of trees, it may be at once stated that the figures quoted in Table D do not represent anything approaching the total quantities of cherries borne by these trees. It was soon discovered when the trees began to crop that an unsuspected factor was destined to upset any attempt to show their full possibilities in this respect. The sheltering belts of large red gum trees, which lend such a picturesque effect to the

[*E. W. Pritchard, Photo.*]

Early Lyons on Kentish rootstock.

scenic beauties of this locality, are the refuge and home of hosts of fruit-eating birds. Principal amongst these in destructiveness to soft fruits generally, and cherries in particular, are the imported so-called English starling (*Sturnus vulgaris*) and the indigenous "larger Wattle Bird" (*Anthochaera corunculata*). The former is always present in destructive numbers in the orchards of Coromandel Valley during the fruit season, but the latter is more intermittent in its attacks, usually proving seriously pestiferous only in the earlier part of the season, apparently, when its natural food supply is scarce. It is then infinitely more persistent and daring than the starling.

In spite of mechanically operated and other bird scaring devices, combined with considerable slaughter by shot guns, these two pests succeed in destroying large quantities of cherries and other soft fruits in the State

Orchard. Notwithstanding the enhanced prices formerly received for their earlier ripening cherries, the commercial orchardists in this locality have, chiefly owing to this disability, abandoned cherry culture almost entirely. As a consequence, these pests concentrate early in the season on the cherry block in the State Orchard, where some 200 sorts of cherries are grown, and on the smaller plantings in certain trial plots where cherry trees are also included.

CHERRY ROOTSTOCK TRIALS.

TABLE D.—*Fruit Recorded,* 1916-1933.

Year.	Bigarreau Napoleon.							
Planted 1910.	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
1916	—		—		—		—	
1917	—		—		—		—	
1918	—		—		—		—	
1919	18	8	83	8	33	2	32	4
1920	32	8	79	6	55	4	44	11
1921	—		—		—		—	
1922	62	8	146	4	61	0	73	2
1923	25	8	18	8	39	8	46	8
1924	107	12	162	0	84	12	175	0
1925	92	0	67	0	44	8	132	0
1926	64	8	23	0	90	0	107	0
1927	139	8	80	0	92	0	233	0
1928	48	8	15	8	33	8	46	0
1929	3	0	1	0	—		13	0
1930	126	0	137	8	123	0	209	0
1931	38	4	2	0	29	4	176	0
1932	5	12	—		1	0	2	0
1933	120	8	—		165	0	295	0
Total	884	12	815	10	851	14	1,584	9

Year.	Early Lyons.							
Planted 1910.	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
1916	1	1	6	0	4	12	1	15
1917	—		—		—		—	
1918	—		—		—		—	
1919	29	15	47	0	36	10	33	15
1920	26	3	3	15	17	0	18	1
1921	—		—		—		—	
1922	97	0	12	12	51	0	97	0
1923	—		—		—		—	
1924	202	8	57	0	95	0	149	8
1925	115	8	19	12	65	8	48	8
1926	59	12	2	8	15	12	17	0
1927	79	8	10	0	32	0	39	0
1928	—		—		—		—	
1929	—		—		—		—	
1930	160	8	26	8	81	8	92	0
1931	—		—		—		—	
1932	—		—		—		—	
1933	—		—		—		—	
Total	771	15	185	7	399	2	496	15

TABLE D.—*Fruit Recorded*, 1916-1933—continued.

Year.	Early Purple Guigne.							
Planted 1910.	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
1916.............	—		0	11	1	1	—	
1917.............	—		—		—		—	
1918.............	—				—			
1919.............	—		—		—		—	
1920.............	0	13	1	13	2	4	5	5
1921.............	1	4	0	15	2	8	2	10
1922.............	—				—		—	
1923.............	—				—		—	
1924.............	13	4	89	8	47	0	79	12
1925.............	—		45	0	57	8	49	8
1926.............	—				—		—	
1927.............	—		—		—		—	
1928.............	—		16	8	14	4	1	8
1929.............	—				—			
1930.............	23	0	16	0	16	12	59	4
1931.............	—		—				—	
1932.............	—						—	
1933.............	—				—		—	
Total	38	5	170	7	141	5	197	15

Year.	Florence.							
Planted 1910.	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
1916.............	—		—		—		—	
1917.............	—		—		—		—	
1918.............	—		—		—		—	
1919.............	45	13	15	2	6	8	9	8
1920.............	97	5	79	11	12	6	21	0
1921.............	—		—		—		—	
1922.............	176	0	140	8	18	6	25	8
1923.............	119	8	114	8	37	0	34	12
1924.............	228	8	194	8	49	0	32	8
1925.............	200	0	144	0	41	0	102	8
1926.............	58	8	14	8	12	4	15	0
1927.............	199	8	134	8	107	0	160	0
1928.............	49	0	54	0	26	8	37	0
1929.............	25	0	49	0	16	0	59	8
1930.............	147	0	170	0	103	8	182	8
1931.............	127	0	53	8	63	8	121	8
1932.............	34	4	2	4	2	12	44	0
1933.............	148	8	24	8	26	0	230	0
Total	1,649	14	1,190	9	521	12	1,075	4

TABLE D.—*Fruit Recorded,* 1916-1933—continued.

Year.	St. Margaret's.							
Planted 1910.	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
1916	—		—		—		—	
1917	—		—		—		—	
1918	—		—		—		—	
1919	24	0	22	10	—		—	
1920	37	8	13	8	—		—	
1921	—		—		—		—	
1922	54	10	43	0	—		—	
1923	24	0	68	0	—		0	12
1924	111	0	115	8	—		4	4
1925	110	0	61	0	0	4	28	0
1926	—		—		—		—	
1927	59	0	100	0	—		50	0
1928	12	0	28	0	2	0	—	
1929	—		—		—		—	
1930	45	12	58	8	2	0	47	8
1931	—		—		—		—	
1932	—		—		—		—	
1933	24	8	66	0	1	0	59	0
Total	502	6	576	2	5	4	189	8

The figures in Table D may be taken as representing comparative proportions only of the annual yields of the different varieties grown in this trial when worked on the various rootstocks. This statement should perhaps be modified to the extent of saying that the loss of fruit due to bird pests has been proportionately higher from the two earlier ripening varieties, viz., Early Lyons and Early Purple Guigne. The latter variety has not cropped as well as the other varieties in this trial. As indicated previously, the failure to grow the trees of St. Margaret's on the Kentish and on the Kentish-Mazzard combination rootstocks has much reduced the total yields from this variety, whether harvested or destroyed by birds. It was unfortunate that during the years 1917 and 1918, when cropping had just begun, changes in the Orchard management caused a break in the records of this and some other trial plots in the Orchard.

Judging from the context, the yields from these cherry trees could not have been great during these seasons, and in the long run need not seriously affect the ultimate conclusions to be drawn relative to either the aggregate yields or those of the earlier years only.

In the year 1921, the cherry crop failed, and again in 1929. In the latter year, due to some undetermined factor, the blossoms were quite deformed or incompletely formed on all the varieties in this plot, excepting on the Florence. Hence, the absence of any fruit records. In respect to the influence exercised by the various kinds of rootstocks in inducing earlier crop production from the varieties worked upon them, the figures provided by this plot, as shown in Table E, may prove interesting. They certainly only represent the quantities secured from the birds during the first 12 years after planting, or from the seventh year onwards after fruit bearing had begun.

Had the average proportions of the crops been harvested during the seasons 1917, 1918, and 1921, it is quite possible that the total weights borne by the trees grafted on Mahaleb rootstock would have exceeded those produced on the trees worked on the Mazzard stocks up to 1921. At any

rate that would have been in accordance with results claimed to have been obtained by commercial growers of cherries who have used these two stocks. Pursuing the subject further it will be seen in Table F that during the 16 years between 1916 and 1933 in which the harvesting records were taken, that the trees of the five varieties in this trial, when worked on the Mazzard or on the Kentish-Mazzard combination stocks, were seemingly much more prolific than those grafted on either Mahaleb or Kentish rootstocks.

TABLE E.—*Fruit Recorded* 1916 *to* 1922.

Trees Planted 1910. First Seven Years of Cropping.

Variety.	Rootstocks.							
	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
Bigarreau Napoleon	113	8	309	2	149	6	150	1
Early Lyons	154	3	69	11	109	6	150	15
Early Purple Guigne	2	1	3	7	5	13	7	15
Florence	319	2	235	5	37	4	56	0
St. Margaret's	116	2	79	2	- -		—	
	705	0	696	11	301	13	364	15

TABLE F.—1916-1913. *Showing Total Quantities of Fruit recorded from all Varieties grown on the Various Rootstocks.*

Variety.	Rootstocks.							
	Mazzard.		Mahaleb.		Kentish.		Kentish on Mazzard.	
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
Bigarreau Napoleon	884	12	815	10	851	14	1,584	9
Early Lyons	771	15	185	7	399	2	496	15
Early Purple Guigne	38	5	170	7	141	5	197	15
Florence	1,649	14	1,190	9	521	12	1,075	4
St. Margaret's	502	6	576	2	5	4	189	8
	3,847	4	2,938	3	1,919	5	3,544	3

Whilst the different rootstocks did not appear to influence to any appreciable degree the periods of blossoming of the varieties under test, they do appear to exercise valuable effects on the time of ripening. In these tests the fruits on the varieties worked on the Kentish stock ripened first, those on Mahaleb following closely after. Those on the Mazzard followed a little later, and those on the Kentish-Mazzard combination were latest of all. It would certainly appear as if the intervention of the Kentish stem piece in the combination in some way delayed fruit maturity. There is no evidence that its presence induced earlier productiveness than noted in the trees worked directly on the Mazzard rootstock. Whether this delayed ripening would be borne out by trials made under the conditions found more suitable for cherry growing, or would have a commercial value if proved to be correct, remains for future testing to decide. The location or position in the plot occupied by this combination stock may be a factor in delaying the ripening. The row runs along the slope 52ft. distant from the topmost row, which is composed of trees on Mazzard stock. The fall

in the land is 8ft. between the positions occupied by these two rows. The differences detectable between the soils and subsoils appear negligible. Soil moisture in abundance in the root area is one of the greatest determining factors in delaying ripening of other stone fruits; but as cherry trees ripen their fruits before the moisture from winter rains becomes depleted to any serious degree, the possibility of the slightly lower position remaining much moister than that occupied by the other rootstocks is very remote.

The measurements of growth collected from this row of trees on the combination stock do not indicate up to the present that the reduced diameter of the intermediate Kentish stem piece has retarded their vitality to any serious extent. If it had, one might expect earlier ripening to eventuate, as is evident on the same sorts of cherries worked on Kentish

[*E. W. Pritchard, Photo.*]

Florence on Kentish rootstock.

rootstocks. It may be incidentally stated that the intermediate stem piece of Kentish—contrary to what Swarbrick and Roberts in the summary to Research Bulletin 78 of the Agricultural Experiment Station of University of Wisconsin, issued August, 1927, declares to occur in apple trees—has not apparently caused the Mazzard root system to assume the root character of the Kentish cherry.

In the environment under which these cherry trees have carried their crops, it has not been possible to form any definite conclusions relative to the comparative qualities of the fruits produced by the different varieties of the sweet cherry grown on the respective rootstocks. To secure even the proportion set out in the accompanying tables, the fruit was mostly gathered whilst still in a hard and relatively immature condition. Many of our growers of high-quality cherries claim that whilst the fruits borne by certain varieties grown on Mahaleb stocks are excellent, still, taken as a general average, the same variety yields fruits of superior quality, and certainly in increased quantities, when grafted on the Mazzard rootstocks.

It is claimed that the Mahaleb induces a super-abundance of blossoms resulting in a somewhat scattered setting of cherries. Trees on this rootstock crop well, and frequently in the "off" season for the cherry crop they show up to advantage. They are, however, declared to be comparatively short lived, tending to die back gradually from the upper limbs downwards.

The Kentish rootstock, when planted in rich, deep soils, is claimed by commercial cherrygrowers to suit the Black Tartarian variety well, inducing good growth and the production of good crops of average marketable quality. Bigarreau Twyford and Waterloo are only moderately successful on it, whilst Werder's and Knight's Black and Florence are said to be failures. St. Margaret's is stated to be over dwarfed on this stock. In this trial only the two last-named varieties were grown on this stock,

Bigarreau Napoleon on Kentish on Mazzard rootstock.

and a glance at Table F shows that the two white or light upright growing varieties—Bigarreau Napoleon and Florence—cropped reasonably well on Kentish, and produced fruit of fair average quality. As has been previously stated, the opinion generally held by the commercial growers of cherries in the Mount Lofty Ranges is that the Mazzard rootstock not only produces the healthiest and longest-lived trees of all varieties of the sweet cherry, but on it they also crop more heavily and longer, and on the whole, the fruit is of better uniform quality and size. This conviction is evidenced in the fact that of recent years *they have planted sweet cherry trees on no other stock.*

In so far as any evidence can be adduced from the cherry rootstock trial conducted at the State Orchard at Blackwood from 1910 to 1933, it tends to support the knowledge gained through experience by the two or three generations of commercial cherrygrowers in this State.

When all of the circumstances surrounding this trial are held up for consideration, the data collected of tree growth and crop production may be deemed incomplete and scrappy. When attempting to erect a comparison between the varying effects of these different rootstocks upon the

five varieties of sweet cherries worked upon them, there seems, in the writer's opinion, no more convincing evidence than that displayed in the present condition of these trees, after the lapse of 24 years when to prove profitable they should be at the zenith of productiveness. Of the 15 trees of the five varieties grown on the seedling Mazzard rootstocks, only one is giving signs of decline. This tree is located in a corner of the plot where two roadways cross at right angles. In this position, it receives the full brunt of the prevailing cold south-easterly winds coming directly down from the higher slopes of the ranges. When storm waters overflow the watertables, they erode away the looser and richer surface soil from much of the area occupied by its root system. In the writer's opinion, these have been the principal factors affecting its health. The remainder of the trees in this row are extremely healthy and robust—surprisingly

[*E. W. Pritchard, Photo.*]

Early Lyons on Kentish on Mazzard rootstock.

so, when the shallow and comparatively poor type of surface loam is taken into consideration.

As the accompanying photographs indicate, the affinity between the Mazzard rootstock and each of the five varieties worked thereon would seem very nearly perfect. So even has the growth around the point of union proved to be, that only after the closest scrutiny could it be clearly determined, in many instances, when the more recent stem measurements were being taken.

Of the 15 trees of the same five varieties grafted on Mahaleb rootstocks —and which originally grew so well—six are now dead. Two are rapidly declining, and will probably die during the coming summer, whilst the remaining seven are quite stagnant and each shows evidence of progressively dying back at the terminals of all limbs. In this trial, the Mahaleb stock did not appreciably, during the first 10 years, dwarf the trees worked on it, but since then it has most certainly hastened their decline. Some of

those already dead could, at the time of being removed, have been classed amongst the tallest trees in the plot. In every case, the distortion characteristic of the stem at the point of union of this rootsock with the scion variety was strongly in evidence. It stands out from the vertical alignment of rootstock and tree stem as distinctly as a prominently moulded cornice protrudes around a cylindrical column of a building.

The growth of the 12 trees of four varieties worked on the Kentish rootstock has been conspicuously dwarfed by its influence. As previously related, the trees of the fifth sort (St. Margaret's), having failed at the first planting, their successors did not seriously enter into the trial.

These 12 mature trees have maintained a fair standard of health. They appear, however, to have reached a stage of growth when the yearly vegeta-

[*E. W. Pritchard, Photo.*]

Early Purple Guigne on Kentish on Mazzard rootstock.

tive effort results only in extending at the points of the spurs sufficiently to produce each Spring a tuft of leaves and a small cluster of flowers. There is no evidence of branch extension having taken place of recent years. If it were not that identically similar effects may be seen on cherry trees of the same varieties growing on the Kentish stocks located under the most favourable conditions of soil and climate in the Mount Lofty Ranges, one might attribute much of this restriction of tree size to the shallowness and unsuitable nature of the soil in the Blackwood trial plot. Amongst the varieties under test the Early Lyons has shown the best tree development, but in crop yields it has not equalled those of Bigarreau Napoleon or Florence on the Kentish rootstock. The stem development or distortion typical of the effect of this rootstock on sweet cherry scion varieties takes the form assumed by the stem of a currant grape vine to which the annual cincture has been repeatedly applied to one position, or it may be likened to the rapidly growing stem of a young fruit tree around which a wire or label string has been allowed to remain unloosened,

In these cases, it is claimed that the prevention or retardation of the flow of elaborated sap back to the roots caused undue expansion of the area, owing to the excessive concentration of new tissue immediately above the point of restriction. In common terms, it may be stated that the effect of the Kentish rootstock is to induce a considerable enlargement of the stem of the sweet cherry tree immediately, and for some distance above, the line of its union with the scion variety. This gives the stem a top-heavy appearance. If the tree be grafted very low, or the line of union of stock and scion is buried when planting the tree into the orchard, this effect is hidden. In the accompanying illustration of the Early Lyons variety growing on this rootstock, the uncovered base of the butt of the tree is shown in the figure on the right hand side.

Florence on Kentish on Mazzard rootstock.

Of the 15 trees originally set out in the plot on the Kentish on Mazzard rootstock combination, two of the St. Margaret's variety perished in early years after an attack of Curculio Beetles, and one of the Florence died from some unknown cause whilst quite young. The 12 remaining mature trees consist of three trees each of three varieties, two trees of another, and one only of St. Margaret's variety. The use of this intermediate stem piece of Kentish cherry, although considerably restricting the expansion of that portion of the trunk, has not thus far, at any rate, had any apparent effect in the direction of retarding the development of the tree top generally.

The measurements of the Mazzard rootstocks below, and those of the actual tree stem above this inserted portion, have revealed an average expansion of a fairly normal character in both. The limbs and branches are exceedingly robust. The sketches and observations of the root system made during the progress of the excavation work indicate that the presence of this stem piece did not prevent the effective rehabilitation of the root

system of the tree examined when, from some unknown cause, a heavy mortality of the original main roots had taken place. That this recovery was not only effective, but had been rapidly achieved, is evidenced by the fact that until the excavating was recently carried out, the failure of these roots had not even been suspected, so well had the healthy condition of the tree been maintained. This power of recovery would appear to be a feature of the Mazzard root system, which, as far as our investigations reveal, is poorly developed in the Mahaleb, at any rate, when labouring under the unhappy union which it appears to make with a sweet cherry scion variety.

There would appear from the evidence found during this trial that a greater incompatability exists between the *Prunus Mahaleb* and the varieties of *Prunus avium*, than is found to exist between the varieties of *Prunus cerasus* and the sweet cherries. The dislocation of the physiological processes which is set up in the tisues at the line of union, or

[*E. W. Pritchard, Photo.*]

St. Margaret's on Kentish on Mazzard rootstock.

attempted fusion between the Mahaleb rootstock and the sweet cherry variety, is evidently more intensified and fundamental in character than is the case either where the Kentish rootstock is used alone, or the Kentish intermediate stem piece is inserted. The latter would appear to slow down the translocation or passage of the crude or the elaborated sap, or both, but apparently it does not break the continuity of the conducting vessels, as would seem to be the ultimate effect set up between the Mahaleb rootstock and the scion variety of sweet cherry worked upon it. It is claimed that the Kentish (*Prunus cerasus*) and the sweet cherry (*Prunus avium*) have been hybridised, resulting in the production of the so-called Duke type of cherry, the trees of which display certain of the morphological characters of the latter, and the fruits appear to possess some of the acidity of the former species. This quality of crossbreeding may imply a closer genetic relationship, and hint at a greater compatability for fusing into a more lasting union of stock and scion which is so essential to the success of this work.

In 1924, the writer carefully examined and recorded his observations on the points or lines of union on the trunks of 148 named varieties of cherry trees growing in the collection in the State Orchard at Blackwood, all of which had been worked on the same batch of seedling Mazzard rootstocks from which those used in the stock trial had been selected. These varieties had been planted out in the Orchard in 1911. Of this number, 110, or upwards of 74 per cent., were returned as having made perfect unions between stock and scion, and 38 noted as giving some indication of lack of compatability. Whilst a fair proportion of these 38 scion varieties were Kentish or sour cherries, quite a number of those *showing satisfactory unions were also varieties of Prunus cerasus.*

In this trial of rootstocks for sweet cherries, the plants used consisted of reputedly distinct species. In the cases of the Mazzard and Mahaleb, they were plants raised from seedlings, whilst those of the Kentish were suckers or accidental stools arising from the roots of orchard trees. As these latter were unlikely to have arisen around a single parent sour cherry tree, there are possible variations inherent to some of these plants, apart from anything due to extraneous conditions and attributable to causes which are not constant.

As each of the seedling Mazzard and Mahaleb stock plants are almost certain to have arisen from the fusion of genitive elements from two distinct parent plants, they also are likely to possess varying characteristics of growth and affinity in relation to the scion varieties worked upon them. These are possible factors in respect to which no attempt is made herein to estimate their comparative effects on the behaviour of the scion varieties as described in this trial. In so far as the seedling Mazzard stocks are concerned, the measurements and estimations of external manifestations in respect to the fusions or unions of the scions with these rootstocks give no outward evidence that any variability of a fixed nature exists amongst the rootstocks of the 15 trees, although they have been grafted on to five different varieties. Each rootstock has not only blended its tissues with those of the individual trees of the different varieties in an almost indistinguishable manner, but the growth, health, and general behaviour of the trees are such that up to the present no variable factor appears to be operating through the rootstock.

Although it would seem that by carefully culling the seedling Mazzard rootstocks in respect to their good health and general development, the raising of a tree of high average quality may be assured, the difficulty of obtaining such seeds or seedlings in Australia must ultimately force our nurserymen into the adoption of the use of vegetatively raised cherry rootstocks. The present method of digging up the accidental suckers or stools which arise in the orchards would seem to be a too precarious and haphazard means of supply, and leaves the way open for the introduction or continuance of an unknown degree of variability in such rootstocks.

In the nursery at Blackwood Orchard three types of rootstocks of *Prunus avium* (Mazzard) selected by the East Malling Research Station are being propagated by layering. These are provisionally labelled F 12/1, F 9/1, and F 2/1 by the selectors, but the writer is at present not conversant with their individual origins or merits. Whilst these should be tested for rootstock purposes, it would likewise be advisable for the Horticultural Branch to obtain a number of root cuttings, or of the volunteer stool suckers arising from authentic seedling Mazzard rootstocks on which healthy prolific and long lived sweet cherry trees are growing, and from these endeavour to establish a standard type or types of greater genetic purity for propagational purposes in the future.

[A further section of the report on the State Experiment Orchard will appear in the next issue.]

MEADOW HAY COMPETITION—HILLS DISTRICT.

[Conducted by the South Australian Advisory Committee of the Australian Dairy Council, and judged by Mr. R. Hill, R.D.A. (Agricultural Instructor).]

Position.	Competitor's Name and Address.	Suitability of Plants. 25	Curing. 25	Stage of Cutting. 15	Apparent Nutritive Value. 25	Storing. 10	Total. 100
1	H. B. Peters, Mount Compass	22	24	15	23	10	94
2	M. S. Meyer, Tooperang	22	24	15	23	8	92
3	C. E. Verco, Mount Compass	22	23	14	22	10	91
4	D. F. Sheppard, Prospect Hill (No. 2)	23	21	14	22	10	90
4	T. Smee, Charleston	22	23	14	21	10	90
6	R. Peters, Mount Compass	20	24	14	21	10	89
7	J. P. Dunne, Mount Barker	21	21	14	21	10	87
8	Illowra Est. Ltd., Inman Valley (No. 1)	20	22	14	20	10	86
9	Illowra Est. Ltd., Inman Valley (No. 2)	21	22	14	21	7	85
10	Scammell, A. F., Kangarilla (No. 1)	22	21	12	20	9	84
11	Vigar, W. T., Eden Valley	20	23	13	20	7	83
12	J. J. Sinclair, Myponga	20	20	13	20	8	81
12	A. F. Scammell, Kangarilla (No. 2)	22	20	12	20	7	81
14	D. F. Sheppard, Prospect Hill (No. 1)	21	20	13	20	6	80

Commenting on the winning entry, the judge said the stack entered by Mr. Peters consisted of a mixture of Yorkshire Fog, Subterranean Clover, Perennial Rye Grass, and a trace of White Clover; also a trace of Docks and Rib Grass. It was well protected in a closed-in shed, and exceptionally well cured, there being a high percentage of grasses of good quality. Three hundredweights of salt was sprinkled through the stack, and the hay presented splendid colour. It handled well, and was really excellent hay. All hay was carted within a week of cutting.

PAPERS READ AT CONFERENCES.

MID-NORTH BRANCHES, REDHILL, MARCH 14th.

SOME EXPERIMENTS WITH WHEAT AND OATS.

[F. J. PEDLER, Kooluuga.]

The following paper sets out a few observations on the yield and general behaviour of several varieties of wheat and oats which have been grown on my farm. It includes not only yield per acre, but resistance to disease, wind storms, &c.

Where grain yield only is considered, the most reliable variety has proved to be Ghurka, which I have grown for eleven years. This period includes three dry seasons, and two in which red rust was very prevalent, although a few spots of rust appeared on the flag these seasons.

In 1930 and 1932 no apparent damage was done to either the yield or quality of the grain, as Ghurka was the highest yielder in both seasons.

In addition to being rust-resistant, it appears almost immune to flag smut. It is also proof against damage caused by strong winds, the short stiff straw neither breaking off nor allowing the head to shed its grain. This variety is not suitable for hay—it is too short in the straw and is unpalatable. This also applies to the stubble, which even sheep do not care for.

Two other very reliable yielders are Sword and Ranee. Sword is the best all-round or dual-purpose wheat in this district, for, in addition to being a consistently good grain yielder, the variety is fairly resistant to rust and flag smut, and is an excellent hay wheat. Horses prefer it to many other kinds and it also gives good yields of hay per acre. The stubble is also favoured by stock, and makes useful covering for stacks, &c. Sword, however, has the tendency to shed its grain in rough weather. This average yield over seven years is high.

Ranee, first grown in 1928 and supplanted in 1931 by the later selection Ranee 4 H—which proved definitely better than the original—is perhaps a better grain yielder than Sword or even Ghurka, especially when the seasons are below average rainfall. Ranee 4 H is moderately resistant to rust, flag smut, and damage by storms, considering that it is easily threshed. It is perhaps more susceptible to damage by frost than many others. The hay is of poor quality, likewise the stubbles. Currawa, once a general favourite in this district, seems to have been superseded by the foregoing; its yield in the list of results for the last two years is near the bottom.

Quality is one of the early wheats which give fair returns, and is resistant to rust, and has never had a bad attack of flag smut. It sheds its grain very easily and cannot be safely grown in large acreages.

Of the new varieties—some only two years under test—Bencubbin and Dundee have given results which are very encouraging. Neither variety has shown any indication of flag smut, and both thresh easily, yet do not shatter readily. Bencubbin, however, has a tendency to lodge badly with heavy rains on it. As it is a fairly tall grower, it could be utilised for hay if necessary.

Dundee, somewhat resembling Federation, cannot be recommended for hay, its chief virtues being a good yielder and a good quality flour wheat. The yield—equal to that of Ranee in the last two seasons—coupled with its reputation in New South Wales, make it one that I have no hesitation in recommending.

Two selections from Ghurka—G.S. III. and G 2—have given very satisfactory results in both yield and disease resistance. Mogul, a variety which has a good record in certain parts of Victoria and gave fair yields in seasons 1931 to 1933, was last season' disappointing.

Two other varieties which have given fair returns are Calare and Collection. Both, however, are susceptible to a slight attack of flag smut.

[*Papers Read at Conferences.*]

Approximate Yield of Wheat Varieties for Two Years—Seasons 1933 *and* 1934.

	1933.		1934.		Means.	
	Bus.	lbs.	Bus.	lbs.	Bus.	lbs.
Apollo	26	30	20	—	23	15
Baringa	25	40	22	30	24	10
Bencubbin	33	—	28	20	30	50
Calare	28	30	24	40	26	35
Collection	28	—	25	20	26	45
Currawa	26	30	20	—	23	15
Dundee	29	30	28	—	28	40
Ghurka	29	20	26	40	28	—
G 2	29	30	27	—	28	15
G.S. III.	30	20	27	—	28	40
Mogul	29	—	20	15	24	37
Quality	25	30	24	20	25	30
Golden Return	26	20	24	40	25	30
Ranee 4 H	29	40	27	40	28	40
Sword	29	30	26	—	27	45
Oats—						
Guyra	48	—	29	—	38	20
Mulga	44	—	26	—	35	—
Calcutta Cape	36	—	35	—	35	30

Oats.

Out of a number of varieties of oats which I have grown I prefer the following three as best suited for my own use:—Calcutta Cape, Guyra, and Mulga. Calcutta, although slower growing than either of the other two, is still the best for quality hay in whatever stage it is cut. It is also a reliable grain yielder which is suitable for the manufacture of oatmeal and flaked oats.

Guyra is also a good variety for hay as well as a good yielder of plump grain. It stands up well and retains its grain better in rough weather than any other oat that I have grown.

Mulga is much earlier than either of the former, is very useful for grazing purposes, and stock show a marked partiality for it. It is also useful for hay, although perhaps not so bulky as the former two. As a grain yielder it is capable of big yields of grain with a soft, thin, white husk, and is in demand by racehorse owners. Unfortunately, Mulga sheds its grain very easily, often before it is ripe. Stock also clean up Mulga straw as if it were hay.

MIXED FARMING IN THE FOOTHILLS OF THE FLINDERS RANGE.

[P. Curtin, Beetaloo Valley.]

The occupation on a farm in these areas calls for a greater amount of study and forethought than for the lands on the open plain.

A farm of about 900 to 1,000 acres in the foothills is ideal for mixed farming. It should be securely fenced into convenient paddocks of about 80 acres in extent, or even larger or smaller, if creeks, stony reefs, or hills make them difficult to cultivate. For these reasons great care should be taken when erecting divisional fences. Try and make use of red and blue gum for fencing, but if posts have to be purchased, Myall is preferred.

A team of 11 horses is needed, so that one or two foals can be reared each year, and prevent the team from depreciating. Every care should be taken with their feeding and driving.

About 250 acres should be devoted to wheat on fallow, and about 100 acres of barley and oats could be sown early to avoid interfering with the sowing of the main crop. This could be sown on stubble ground, and, if a success, could be reaped or cut for feeding purposes. Crop every third year—fallow, wheat, grass; and by this method prevent the fallow from washing away into gutters. The ground is always in better

[*Papers Read at Conferences.*]

heart, and returns higher yields, with less workings, than if cropped every other year. There is not much difference in cultivated and ploughed fallow, but the latter in the hills is preferred, because the soil has not the same tendency to wash. Cultivating should be done while there is plenty of moisture in the ground. Avoid dry working if possible, but keep the fallow clean at all costs. The wheats most suitable for these parts are: for hay and grain, Sword, Waratah, Nabawa; and grain, Ranee and Currawa.

In conjunction with this amount of wheat grown each year 500 to 600 sheep could be kept. The plain-bodied Merino is the best sheep for farmers, keeping mostly wethers, as they can rough it better than ewes and lambs. Sheep do much better if changed frequently from one paddock to another. They do not require a great deal of attention, providing they are free from flies.

Dairying, at prices obtained for butter, will not pay on these areas, but it is advisable to keep two or three cows for the home requirements.

Along the ranges there are many choice spots which can be profitably adapted to almost any fruit. Wherever water is available and suitable for irrigation, a garden should be planted. Owing to the ravages of birds and other pests, citrus trees are favoured if suitable sandy soils are to be had. These will return (when in bearing) £2 to £3 a tree on prices obtained over the last few years.

One or two acres of garden peas can be sown every year. These do really well, and often a good price can be obtained. To make mixed farming a success, take on only what can be done well.

Care should be taken of all implements, harness, and tools, for without these being in good order, work cannot be done satisfactorily.

PIGS ON A MID-NORTHERN FARM.

[T. R. WELBOURNE, Narridy.]

It is not intended to discuss all breeds of pigs, but it would be an advantage to the industry if many of the breeds were wiped out. This would enable a more uniform type to be produced and help gain the confidence of the overseas buyer. This is most important, as the Abattoirs requirements are, roughly, 1,000 pigs a week, so that when this is exceeded—as it has been during the last couple of years—breeders must produce what the overseas buyer wants and insists on.

BREEDS.

The Berkshire is the bugbear of the industry. One of the greatest difficulties to-day is to get the man that has been breeding Berkshires to advance with the times and produce something more saleable, instead of putting pigs on the market that bring forth caustic remarks from the buyers. This pig is the wrong shape in almost every way, being too heavy in the head and too thick in the shoulder, carrying too much fat on the back, lacking in length of side, and having large hams which to-day are not in demand.

Recently the Canadian Berkshire has been imported into this State. This pig, crossed with the Large White, should revolutionise the baconers of this State, as it supplies the hams in which the Large White is deficient.

The Tamworth is a decidedly better pig; it shows superior length of side, lighter head and shoulder, and if a producer goes to the trouble of selecting pigs of this breed, he can produce a pig that will command a good price, especially from local buyers.

The Large White is the popular breed to-day. To breed pigs for export, it is most important to have a Large White sire, as the colour is white, and this is essential. This pig's main attraction is its length of loin. It is light in bone, shoulder, and head. Unless breeding for stud purposes, the breed is not recommended, because it falls away too much at the hams.

[*Papers Read at Conferences.*]

TYPES FOR EXPORT.

Remember when producing a pig for export that the loin is the greatest consideration. The longer the better, and the pig must show depth, head and shoulders light, bone fine. and hams shapely but not too heavy. Overfat pigs are not payable, and the best way to tell if a pig is fat enough is to press lightly on its back, and if the backbone can just be felt, it will have the correct amount of fat.

My best results have been obtained by mating the Large White boar with Tamworth and Tamworth-Berkshire sows. If entering pigs in the baconer class at shows, always choose females, as they are better shaped around the hams.

I do not advise anyone to set out breeding porkers for two reasons, one being that the cost of selling and railing to Abattoirs is out of proportion to the amount received, and if a few porkers are needed for home use, there is always a percentage of baconers that are short and fat, and these can be taken off at your convenience.

SELECTION OF BOAR.

Unless going in for stud breeding, there is only one sire for present-day requirements: the Large White, and farmers should ask the Department of Agriculture to inspect the boar. The care of the young boar is most important. Let it be assumed that 20 even suckers have been bred from three sows and your ambition is to top the Abattoirs market with baconers in 20 weeks from birth. I suggest the following hints:—

1. Take the three smallest pigs from each litter and sell them in the market, for these take six to eight weeks longer to fatten than the others.

2. Allow the pigs a large yard with a waterhole in it; this is very necessary, and keeps the pigs free from vermin.

3. At 12 weeks of age take off the six best and feed separately. At 15 weeks, if any of the balance are moving away, take them off and again pen separately. By this

method the first pen will be at the Abattoirs in from 19-20 weeks from birth, the seconds at 22, and the balance in 24 or a little more. If there are more than six pigs in a sty they do not move along so rapidly.

SELLING.

The only outlet for the baconer is the Abattoirs. The cost of selling is approximately 6s.—very high, but unavoidable when the breeder is 100 miles from the market. But there is room for complaint in the lack of information obtainable from the selling agents. Only recently my neighbour and I put pigs in a lorry to go to the railway, and we had to brand them to know them when we got there. In my opinion, the pigs would weigh the same; the only point in my favour was that my pigs showed a little more length, and when we received our statements I had received 57s. and my friend 41s. At present we have no way of finding out why there should be such a difference, and I think the time will soon come when we will need to have a man available to attend the Abattoirs and report on the pigs. It is not of any use experts telling us to produce a certain type of pig if we are unable to have our mistakes pointed out after trying to achieve the required type.

FEEDING.

The following is the method I adopt to put baconers on the market in 20 weeks. Feeding six pigs in a sty, they get 3 gallons of skim milk morning and evening, with as much soaked barley as they will comfortably clean up. Mid-day, soaked barley and a little meat-meal. When the pigs are 15 weeks old the meat-meal is increased to 5 per cent.

The cost of meat-meal is practically nil. The pigs fatten on 4½ bags of barley, whereas, without meat-meal, 5 bags are required. To-day half a bag of barley is worth 3s. 6d., and it would not cost that for meat-meal per pig.

In a Victorian test four pigs were put in a sty and fed on wheat. Four more were fed on barley two-thirds and wheat one-third, with free access to meat-meal. In 90 days the pigs fed on the mixture put on 100lbs. more than the pigs fed on wheat alone. The cost per pound of bacon was the same, as the mixture-fed pigs ate more, but to be able to increase the weight by 25lbs. per pig is a consideration worth noting.

The New Zealand experiment was with regard to Tamworth piglets running with the mother. One litter was kept shut up, while the other was allowed grazing. The closed pigs at eight weeks averaged 22lbs. and the grass-fed ones 35lbs.

FINANCIAL POINTS.

With regard to the financial side of pig breeding, the following figures are given. With six sows and a boar 100 bags of barley for a year will be needed. A sow eats a bag a month and a boar two. Should the sow average eight per litter, the price received per sucker will be the price obtained per bag for barley, so to-day one could reckon on 10s. per bag for barley, allowing that the milk was not accounted for.

If breeding baconers, allow 10s. for a sucker at eight weeks, and if you clear 50s. at 20 weeks, that will allow 40s. for the five bags the pig has eaten, showing a return of 8s. per bag.

Another point worthy of consideration is the number of litters a sow should have. I find that the first six litters are the most profitable. After that, the sow should be sold and replaced. I have three sows that came from the one litter. From the first six litters the average number of weaners was 9.2 and from the next four litters the average fell to 6.7, so it will be seen that these sows have been kept too long.

I desire to draw attention to the Export Competitions that are being held monthly and to which very little support has been given. This is a great mistake, for we have reached the stage when we must seek an outlet for our pigs. What is the use of breeding them if we do not look for a buyer?

[Papers Read at Conferences.]

This competition would obtain more entries if the number of pigs was reduced from 5 to 3. As the average farmer only has enough pigs to clean up the skim milk, five seems to eliminate them and leave the competition to the breeders of large numbers of pigs.

VETERINARY SERVICES FOR MIDDLE NORTHERN AREAS.

[R. J. Rose, Laura.]

At the request and on behalf of the Laura Branch of the Agricultural Bureau, the following resolution is submitted:—"That in the opinion of this Conference veterinary services should be provided for the area included in the Middle Northern Conference district, by the establishment of veterinary lodges, or other means."

State-wide Demand for Service.

At nine Agricultural Bureau Conferences during the last two years resolutions have been carried asking the Government to provide veterinary assistance in various parts of the State. These requests were considered by the Advisory Board, and a committee appointed made a recommendation that the present veterinary staff be strengthened, that the State be divided into five districts—Central, South-East, Murray Mallee, Eyre's Peninsula, and Northern—with a veterinary officer in charge at each centre to be decided upon, the staff to be under the control of the Chief Inspector of Stock, Adelaide. The committee further recommended that the duties of country veterinary surgeons should be to supervise the livestock of their districts, and to that end they should travel about their own districts over a definite itinerary. They should give advice, and if possible, practise as veterinary surgeons when required. For such veterinary work they should make a revenue charge on the basis of a fixed scale, it being understood that no charge for mileage shall be imposed upon those requiring their services.

This report was submitted to the Minister of Agriculture, and supported by a deputation which expressed the hope that action would be taken to give effect to the proposal.

[*Papers Read at Conferences.*]

The committee's report and recommendations were submitted to the Chief Inspector of Stock, who in his report to the Minister stressed the following points:—

That in his opinion there are few country districts within the State in which a qualified veterinary surgeon could not be induced to practise his profession if an organised effort was made by the stockowners themselves by means of a guarantee, or by the establishment of a veterinary lodge.

That the provision of veterinary services by the Government should be for the control of contagious stock diseases, the investigation of serious outbreaks of diseases in animals and for veterinary research.

That the requirements of the State in the above respects should be fully supplied before any consideration is given to an extension of the activities of the Department in the manner suggested.

The Minister informed the Advisory Board of Agriculture that he agreed wiht the opinion expressed by the Chief Inspector of Stock.

From the above summary of actions taken by the Advisory Board, the Chief Inspector's report, and the pronouncement by the Minister of Agriculture, it is evident that, while from stockowners' viewpoint it is desirable that veterinary services should be provided as a State instrumentality, from a general taxpayers' viewpoint it is not desirable. Factors that should be considered include the following:—

The cost to the State of carrying into effect the proposal to locate five qualified veterinary surgeons in country districts, for it must not be lost sight of that if such appointments are made, these officers of a necessity must be qualified veterinary surgeons, with recognised status, and not those who are usually termed "quacks."

In the Commonwealth there is only a limited number of University qualified veterinary surgeons, and consequently they can demand high salaries. It has been estimated that from £750 to £1,000 a year would be involved in the appointment, travelling expenses and other incidentals of a district veterinary surgeon, and in the scheme outlined by the Advisory Board committee the only setoff against it would be revenue from veterinary services.

VETERINARY LODGE SCHEME.

From a stockowner's point of view the appointment and maintenance from general revenue of district veterinary surgeons throughout the State may be regarded as a proposition worthy of wholehearted support, but from a general taxpayer's viewpoint it must be regarded as an impracticable proposal. The only proposal which is within the region of practicability is a co-operative scheme—possibly subsidised by the general taxpayer—such as those now functioning as Veterinary Lodges. Where established they have met with more or less success, which is determined by the principles upon which they are established and the management and administration.

Prior to a Veterinary Lodge being established unanimity must be arrived at on the subject of the qualification of the lodge officer. We are rightly or wrongly living in an age which demands specialisation. The trend of much of present-day legislation is in the direction of "one man, one job," the relegation to obscurity of the "quack," the individual who is jack of all professions or trades and a master or specialist of none. Among stockowners there is evidence of the growth of the opinion that as legislation requires a physician and surgeon who renders service to the human body, the dentist who extracts teeth and supplies artificial substitutes, the optician who supplies aids to defective vision, to possess certain definite qualifications, based on world-wide recognised standards—this should also be made to apply to individuals who practice veterinary science, for fee or reward.

While no serious objection may be raised to an individual or a company of individuals employing a blacksmith, carpenter, shop assistant, or a newspaper reporter to render veterinary service—irrespective of qualifications, real or imaginary—the Government as trustees of revenue derived from the general taxpayer, has a right to demand evidence of qualifications to render adequate service before subsidising payment for them.

Mr. Rose then referred at length to the activities of the Balaklava, Point Pass and Blyth Veterinary Lodges.

HOW TO MAKE SHEEP FARMING PROFITABLE.

[H. J. CROUCH (Red Hill).]

About 12 years ago the sheep and wool industry was much more profitable than it is at the present time, for the reason that formerly taxes, freight, wool handling charges, yard fees, costs, &c., were much lighter than they are now. Little science was required, and not so much judgment, nor was it necessary to be so particular regarding the type of sheep to be raised. It behoves every one now engaged in the industry, to give serious consideration to the many circumstances required to obtain the best results.

Sheep more than most animals, are most susceptible to improvement.

To be successful in a general way it is not necessary to commence with the highest class of sheep, but one should try and start with a useful flock of sheep, large framed, free from body and tail wrinkles, and covered with good wool. Under present conditions it does not pay to grow sheep for wool alone, the size of the carcass must be taken into consideration, and then when wool returns of the flock begin to deteriorate, sheep can be sold to the butcher. It is in the latter point that the present wrinkly Merino fails. It is nearly always necessary to keep them until they are full-mouthed, before they will fatten readily.

Every year the flock can be improved by careful culling, and making sure that the rejects are killed for rations or sold.

The aim of the sheep breeder is to make the flock profitable, and any revenue must be derived from the carcass and wool of the animal.

One of the heaviest losses in sheep raising is caused by blow flies. The sheep that are least susceptible to blow fly strike are those with a straight, square tail, free from tail and breech wrinkles. The progeny of the wrinkly Merino ewe mated with a Corriedale ram is remarkably free from fly strike. I prefer to shear the last week in October, and then crutch in March. The fly first strikes the wrinkly tail and breech, and until a type of sheep is bred with a clean, square tail, and wide rump and breech, trouble with the blow fly will continue.

CONFERENCE OF SOUTH-EASTERN BRANCHES, MUNDALLA, 20th MARCH, 1935.

SEEDING.

[G. D. BUTLER, Wolseley.]

OATS.

The first essential of successful farming is efficient and timely sowing of the seed, and the cornerstone of efficient seeding is adequate preparation for it. It is hard to say just when and where this preparation begins, but for wheat a lot of work on the fallows in the preceding winter and spring is needed. For oats sown on wheat stubble, it is necessary to start earlier, and see that the preceding wheat crop is as free as possible from weeds.

Oats seem to be dependent on frequent rains, and do not relish long spells of dry weather, but their worst enemies are weeds. If the preceding wheat crop is dirty, it is in most cases impossible to grow a satisfactory crop of oats after it. Partial success is sometimes obtained by the expenditure of an unreasonable amount of cultivation. There is not much difference between early and late sowing of oats, between mid-April and mid-June gives about the same results on an average, provided that in all cases, cultivation was sufficient.

To make oat-growing profitable, too much work cannot safely be put into cultivation: it appears that unless fair rains occur in March or April, oats must either be sown dry or combined in at the break of the season without prior cultivation. Often when

[*Papers Read at Conferences.*]

a priar cultivation is possible there is no difference between the crop grown thereon and that on the adjoining land simply combined in. Yet, as a factor in destroying weeds and conserving moisture—as far as possible—this prior cultivation should be done. The springtine combine is the best machine for this work. The work done by the discs and scarifiers looks better, but apparently is not fine enough to make a good home for weeds to germinate or for nitrifying bacteria to work in. There are times when only a scarifier or even a plough can be used, but so long as the combine will do the job this implement is preferred.

It is not advisable to sow on this cultivated land before or just after the next substantial rain that falls on it. Leave it for a fortnight or longer to mellow and for some weeds to grow. Heavy crops have been grown by leaving it until all other seeding was completed.

Superphosphate sown on the oat crop is wasted, it may give an advantage sometimes, but mostly it does not. On dirty land, it is detrimental, for it seems to stimulate the weeds unduly.

These methods are for dealing with the bulk of the soils in this district which have been under cultivation for many years. On new ground, or that which has been out to grass for a long time, oats usually do well, no matter how or when they are sown. During the last 20 years, the Department of Agriculture has imported and bred and tested many varieties of oats, but so far one cannot be recommended to supersede Algerians as a general purpose oat for an average cereal district. But there are many seasons when an earlier maturing oat will yield more grain than Algerian, and there is an occasional dry spring when one such will yield more hay. It is advisable, therefore, to sow at least one-third of the oat acreage with an earlier oat—Fulghum is perhaps the best. On the lighter soils, which ripen their crops earlier, this percentage might be increased. When seeding is delayed by climatic conditions and some oats have to be sown late, an early oat is preferable to Algerian. Farmers who habitually sow some early oats often have their hay carted before the wheat is ready to strip.

WHEAT.

As a rule wheat should be sown only on fallow. Occasionally crops succeed on non-fallow, but it is not profitable to practise a crop rotation wherein wheat is sown on non-fallow every year. On some of the lighter soils a short fallow is often better than a long fallow. For the actual sowing of wheat there is no better machine than the modern combine; but just when to use it puzzles the wisest. The second half of May is usually the best time for seeding in a normal season. After the first week in June it is often too wet. This means that the job has to be done in three weeks, not all fine weather. To sow wheat on heavier lands unless about 2in. of rain have fallen in the preceding four or five weeks, is to invite a partial failure from weeds and take-all. Thus, if May is rather dry, the time is shortened.

Experience has led me to sow as soon as the ground is right, but not before, and take the risk of being held up by a wet June. This risk can be minimised in several ways—(1) always include in the fallow at least a small area of well drained land and sow it last; (2) cultivate this area before weeds are too large; (3) use a rigid-tine combine when it is too wet for the spring-tine; (4) drain and level the land as much as possible. Cultivation is necessary, mainly to kill weeds. The earliest growth is the strongest, and if left unchecked would soon be too strong to be killed by one stroke of the combine. The weeds absorb too much of the most readily available plant food needed by the young wheat plant, and the binding action of the roots prevents that fine division of soil particles necessary for good crops. It is, of course, impossible to get on this cultivated land after the heavy rain that often spoils seeding, and often another rain occurs before it is workable. This second or third rain sets the soil so that a springtine combine does not work well, but the rigid-tine combine does first class work. Nearly always the last sown is the best crop, after allowing for the

better quality of land on which it grows. The alternatives to this procedure are—(1) to sow early and have a crop infested with thistles, wild oats, and take-all; or (2) maintain a plant quite out of proportion to the area sown; neither of which will appeal to good farmers.

A burning question every year is: "Shall the whole of the fallow be cultivated before combining in the seed?" The answer depends on the date and the amount of the opening rains, the density of weed infestation, the general condition of the fallow, the nature of the soil, the strength and plant available, the present weather and the look of what is coming, the probable price of wheat next harvest and the state of preparedness in which the farmer finds himself. As all these conditions are never uniform, either in themselves or in their respective relations to each other, the solution can only be left to the judgment of the farmer. It is advisable to work all heavy or safe land to kill the first crop of weeds, but do not take many risks with those areas most likely to be waterlogged. At least one autumn working is advocated to fill in the cracks made by the heat of summer. A good set of harrows will do this if autumn rains do not warrant a cultivation. Experiments at Longerenong show that prior to 1925 July seeding consistently gave better yields than May-June sowing; being continued until 1930, the May-June seeding consistently gave better results than the July seeding. It was explained that in the years after 1925 the fallows received much better spring and summer working than in the years 1918-25.

VARIETIES.

At present the whole question of varieties is unsettled, by the question of milling quality, but to fill the bags there is nothing better than Gallipoli for the earliest sowing. Ghurka will not compete with weeds so well, but for mid-season sowing it is as good as, or better than Gallipoli, and where a lot of straw is to be avoided it is preferable. For May and early June sowings, no other wheats compare with these. When the growing period is short, as it is when seeding is very late, they do not yield so well as an earlier maturing wheat. Of these early wheats, Ranee 4H is preferred.

Two or three varieties are enough on one farm. If seasons were more uniform, only one would be desirable. Gallipoli is not yet to be spurned, for in those seasons when oat crops are too short and scanty for hay, it will be better to cut than most other varieties. When saving seed, I keep on hand enough Gallipoli to sow one-fifth of the acreage, enough Ghurka for three-fifths, and enough Ranee for the other one-fifth. But in case the seeding may be later than usual, I keep a reserve of Ranee and give it to the fowls if it is not wanted. The seed should be well cleaned of all chaff, straw and other rubbish, particularly of cracked and broken grains. It was once thought settled that grading paid, that the plumpest grain must necessarily produce the best crop, but doubts have since arisen, and many samples of seed badly shrivelled by rust have been known to grow remarkably good crops. I prefer to be on the safe side and grade all wheat and barley, dusting the wheat with about 1oz. per bushel of copper oxychloride.

QUANTITIES.

Fifty to sixty lbs. of Gallipoli and Ranee and 45lbs. of Ghurka are sufficient to sow on my land. On lighter soils these quantities might be increased, but it must be remembered that these newer varieties have a much grater survival ratio than the older ones, and therefore the individual plants need more room. These quantities are not always enough to keep the weeds down, but it is preferable to allow a few weeds to grow rather than crowd the wheat. No drill will sow exactly what it is set to sow year in and year out; each machine should be tested by a weighed quantity of grain each year.

An application of superphosphate is necessary for profitable wheatgrowing: 56lbs. as a minimum and 112lbs. as a maximum for this district is suggested. It is a mistake to put a lot of super on poorly worked land, hoping that the extra super will make

up for the inadequate cultivation. The wheat plant, being unable to get its other food requirements in sufficient quantities is unable to use this extra phosphate. It stimulates wild oats, and so becomes worse than a dead loss. With star feeds, all grades are delivered in "blobs," but as the stars travel faster to sow the larger quantities of the lower grade, the "blobs" are not delivered so far apart. Stars should be set so that not one of them is dropping its "blob" exactly at the same time as its immediate neighbour.

The great point, however, is to be prepared. Many poor crops have been grown in this district because growers were not ready for action when the opening rains came. Have all the super in the shed by at least the middle of April, get the chaff shed full, go through all harness and tackling and repair or replace until it is in strong working order. Examine the combine carefully, get in an extra supply of combine shares, trim and shorten horses' tails, otherwise the long hair is always in the way when grooming and harnessing, chisel down any hoofs that are too long or splitting, on sticky ground remove all shoes, do not overwork the team, horses should be well fed and have moderate work in between harvest and seed time—after a long spell their muscles are soft, the straighter the machine is driven the easier it will be on the team, and the sooner the job will be done.

SOME DIGESTIVE DISEASES OF FARM ANIMALS.

With Suggestions for Treatment and Prevention.

[A. Ross, Mundalla.]

In country districts situated far from professional service, it is absolutely essential that farmers should have some knowledge of the ailments and diseases which are likely to affect their stock. In the majority of cases these people are thrown on their own resources, and in case of sickness among stock, have to depend on whatever knowledge they possess. The treatment of symptoms without a diagnosis is always unsatisfactory, but once an observant farmer has seen and understood a case of sickness in an animal he will generally recognise all similar cases in future. There should not exist in the farmers an implicit belief in drugs. The indiscriminate use of drugs is to be deprecated. Remember animals often recover not because of the treatment but in spite of it.

Diagnosis is the art of determining the nature, location and progress of disease. Without a correct diagnosis it is impossible intelligently to prescribe treatment, hence the importance of ascertaining what ails the animal before proceeding to treat it is apparent. Much more attention is now being given to the prevention and control of disease than in the past. Stockowners are beginning to realise that it is much more economical to keep animals free from disease than to wait until they get sick and then spend both time and money in attempting to restore them to health.

Treatment consists in removing the cause of the disease, and in supporting Nature in her endeavour to combat the malady. It is of no use treating the symptoms only, and allowing the cause to still operate.

MEDICINES.

The different forms in which medicine may be given by the mouth include drenches, balls, powders and pastes (electuaries). Most fluids are given as a drench and they require to be very carefully given. A beer bottle with about 8in. or 9in. of 1in. rubber hose slipped over the neck is good—even better than a drenching bit for this purpose. Only a little of the drench should be poured into the mouth at a time, and the animal allowed to swallow this before giving more. Swallowing can generally be induced by tickling the roof of the mouth. Never interfere with the tongue or pinch the throat or pour anything down the nostril, as this would be almost sure to cause a fatal pneumonia. The head should not be held too high and if the animal gives the slightest cough, the head should be lowered immediately. Cattle seldom receive medicine in any

[*Papers Read at Conferences.*]

other form than the drench, and as a rule, are easy to dose. Medicines are also given to horses in the form of a ball, and this is quite a convenient way, once one is used to it, especially if the horse is awkward to drench. Powders are a very convenient way also of giving medicine to animals, and are usually given in the feed, for which reason they should not contain substances having a disagreeable taste. The feed should be damped slightly and the powder thoroughly mixed with it to ensure the patient receives it all. Soluble substances with little or no taste can be given in the drinking water. Pastes are also a convenient way to administer medicines, more especially if it is dangerous to give it otherwise, or if a local effect is desired. The ingredients are mixed with treacle and smeared on the back of the tongue with a piece of flat board.

The majority of cases of sickness among the larger animals at any rate, appear to be connected with the digestive tract, and can generally be traced to some error in feeding, watering or management.

THE DIGESTIVE ORGANS OF THE HORSE AND COW.

In the cow, the stomach or paunch is so large that it fills up the whole of the left side of the abdominal cavity and a part of the right half. It is compound and consists of four compartments, viz., the paunch, the honeycomb, the bible, and the fourth or true stomach. The capacity of this great organ is up to 40galls.; the first compartment constituting about 80 per cent., except in very young milk fed calves, when the fourth compartment is the larger. The stomach of the horse, on the other hand, has a capacity of only 3 to 3½galls., but what the horse lacks in stomach, he makes up in bowels. Therefore, most of the digestive troubles of the horse occur in the bowels, whilst most of those of the cow occur in the stomach. The large bowels of the horse, known as the watergut and large colon, are often mistakenly called the paunch by the farmer—the horse has no paunch. Food swallowed by the horse passes to the stomach, where it remains only a short time, whilst being mixed with gastric juices. It then passes into the small intestines (about 72 feet), where it meets the bile from the liver and other juices, and the finer parts of the food are absorbed. The coarser parts pass on to the watergut and large colon, where the coarse or fibre parts (cellulose) are broken down by bacterial action and absorbed, the residue passing on to the rectum, where it is moulded into balls, and expelled. Little or no absorption takes place in the horse's stomach.

The cow, on the other hand, greedily swallows her food, which passes into the paunch, which acts as a kind of silo. Some little time after feeding, rumination commences, and the coarser material is returned to the mouth to be thoroughly chewed at leisure and mixed with saliva, when it is again swallowed. The rechewed material then passes to the bible, where all the moisture is squeezed out, and the food further triturated between the horny leaves of this organ, from where it passes to the fourth stomach, where true digestion commences.

[*Papers Read at Conferences.*]

When a cow develops some sudden digestive trouble, a good first-aid drench to give is mag. sulph. 1 to 1½lbs., ground ginger 1½ozs., ammonium carbonate 1oz., treacle ½ cup, water 2 pints. Follow with powdered nux vomica 1 teaspoonful, mixed with treacle and smeared on the tongue twice daily for a few days. For bloat or hoven 1 pint raw oil, 3 tablespoons oil of turpentine and half cup powdered charcoal is good, or a small teaspoon of Condy's crystals in a quart of warm water could be given. A wooden gag, such as a piece of broom handle placed in the mouth and tied to the horns to keep it in position is useful. In very severe cases a trocar and canula or clean pocket knife may be necessary to relieve the tension, but as a rule the gag would be effective; when the acute symptoms are relieved give the saline drench.

Traumatic indigestion often occurs in cattle, especially the family cow. This is due to swallowing foreign material, such as nails, tacks, pieces of wire, wood or bone. In some cases no harm accrues, the article being only discovered on butchering. In other cases the material finds its way to the honey comb stomach, where some of the sharp objects set up ulceration and gradually perforate the wall and work forward to the lungs or heart with fatal result. No treatment is of much use, but the provision of a good mineral lick or mixture will often prevent the trouble.

COLIC IN THE HORSE.

The disease of the horse that is most frequently met with is what is termed "colic," and many are the remedies that are reputed to be "sure cures" for this disease. The term "colic" is applied loosely to almost all diseases of the organs of the abdomen that are accompanied by pain, but in this paper it is intended to deal with diseases of the digestive canal only. Many horses die of bowel trouble while their owners are treating them for water trouble. A horse seldom has water trouble, and if farmers would treat their horses for bowel trouble, they would have far better results. If there is retention of water due to pain or pressure, an exploration by the greased hand will detect the distended bladder, which can generally be emptied by gentle pressure backwards. In any case, when the pain is relieved the horse will generally urinate freely. In the mare the finger inserted in the uretha will cause the water to pass. Never insert any irritating substance in the vagina for this purpose, although a slice of onion may be permissible.

Cases of true colic can be considered as follows:—(1) Spasmodic (gripes), (2) flatulent (wind), (3) impaction colic, (4) worm colic, (5) sand colic. It is unlikely that the average farmer will be able to distinguish one kind of colic from another with certainty, so treatment on general lines is recommended. For the first two the following would be good treatment:—1 to 1½ pints raw oil, 1oz. oil of turpentine, ½ to 1oz. chloral hydrate, and if evidence of much wind, 1 tablespoon of formalin added would retard fermentation. If the above remedies were not available, a nobbler of whisky or gin in a pint of water could be tried, and repeated in an hour, or baking soda and ginger in water followed by a pint of strong coffee might bring relief. In all cases, enemas of warm soapy water should be given every two hours—after back-raking. For impaction colic 1 to 1½ pints raw oil and 4 tablespoons of oil of turpentine well shaken up can be given, followed every two hours by sweet spirits of nitre 1oz., aromatic spirits of ammonia 1oz., treacle ½ cup, water 1 pint, until 3 doses have been given followed by enemas and backraking as before. Repeat whole treatment in 24 hours if no movement. Another word of warning here—never give laudanum when a movement of the bowels is desired, as this drug retards bowel movement.

For Sand.—1lb. honey in 1 pint new milk, followed in 5 hours by the treatment recommended for impaction. Follow up all cases with 1 teaspoon of powdered nux vomica on tongue twice daily for a few days.

For Diarrhoea (Scours).—It is generally conceded that the best treatment is to first remove the offending matter with a laxative drench, and then, if necessary, give astringents in gruel.

[Papers Read at Conferences.]

Inflammation of the Bowels.

In horses, this is a very serious and fatal disease, and generally occurs as a sequel to neglected cases of colic, damage to the bowel by intestinal parasites, bad food, irritant medicines, &c. The interior of the bowels normally swarm with germs of every variety, but so long as the mucous lining of the organ remains whole and uninfluenced by adverse conditions, these germs are of no consequence, and may even be helpful to intestinal digestion. But when anything occurs to damage or depress the cells composing this lining membrane, the germs at once become aggressive. They penetrate into the walls of the bowel, and set up a fatal colic, and permit the absorption of poisonous toxins, &c., into the general circulation. The symptoms are at first similar to colic, but later breathing becomes hurried, the pulse hard, fast and wiry, and the visible membranes become congested. Pressure applied to the abdomen causes pain. The dung has a bad odour, and is often covered with mucous. Such a case is a hopeless one to treat once the acute symptoms appear, but in the early stages might respond to careful nursing. Raw oil, 1 pint, and sweet spirits of nitre, 1oz., could be given, followed in 2 hours by ½oz. veterinary chlorodyne in thin gruel. Hot blankets applied to the belly give relief, but chill should be guarded against when changing. All cases of ordinary colic should be promptly treated in order to prevent this most serious disease.

Bots.

A good deal has been written and said about these "popular" parasites, and they at least furnish the horse-owner with a convenient method of accounting for the death of horses that have died from some unknown cause. Although it is claimed by most authorities that the bots do very little harm while in the horse's stomach, where they attach themselves to the lining of the organ by their hooked mouths and live on the inflammatory products of the small ulcers which they cause, they may cause death in odd cases by being present in such numbers so as to block up the opening into the small bowel (pylorus), and thereby cause a mechanical stoppage, or, in still rarer cases, may perforate the wall of the stomach. Owing to the nature of their attachment, and the toughness of their hides, they are very hard to treat, but carbon bi-sulphide (4 drams in a gelatine capsule) will expel many of them. This drug, however, is very dangerous, and may cause serious damage if unskilfully given; 2ozs. of turpentine in a pint of raw oil, well shaken up and given on an empty stomach, is far safer, but not so effective. Smearing the hair with a strong-smelling repellant or singeing the eggs is a preventive.

Wheat Gorge.

Hardly a year passes without some horses getting at wheat, and if farmers would make themselves acquainted with the treatment for this trouble, and avoid the valuable time lost while waiting for someone else to come, many fatalities would be avoided. As soon as it is discovered that the horse has got at wheat, give ½lb. bi-carbonate of soda in 2 pints of water. Repeat every 2 hours while necessary. Encourage the animal to drink as much water as possible. Three hours after the first drench give raw oil, 1½ pints, and turpentine 4 tablespoons, well shaken, or 1lb. magnesia sulphur. Next day give the soda drench morning and night. If founder threatens, lower the heels, and stand the animal in water all day, and put on soft standing at night. Bleeding at the jugular vein, 3 or 4 quarts, might be helpful.

While patent medicines are convenient, and may contain the drugs desired, they should be used with caution, especially in serious cases. Experience has demonstrated that it is better to treat each case on its own merits with the medicine especially indicated, and to treat the complications as they arise, than to give medicine containing a number of drugs, some of which are certain to be of no value, or even harmful. Besides, they are many times more expensive. The same applies to licks; those made up yourself from recommendations that will be gladly supplied by Government Veterinary Officers will generally give excellent results.

[*Papers Read at Conferences.*]

TOP DRESSING OF PASTURE LANDS.

[R. A. DINNING, Mundalla.]

Perhaps this short paper could have been better termed, "Our Experiences in Top-Dressing," as it is based solely upon our dealings with light, loamy soils, and may not apply too well to heavier land. The idea of top-dressing, although for more feed, and better feed, must necessarily be profitable; so the question, "Does top-dressing pay?" covers a wide scope. Referring to the land in its virgin state, the reply is certainly, "No." Then after the land has been cleared and broken up, a heavy dressing certainly makes a difference, but not a payable one. On our class of land, even after it has been under natural pasture for a number of years, the herbage is not dense enough to return the full advantage of the super. By dressing with a bag to the acre the first year, and half a bag afterwards, this land can be built up in 4 or 5 years to quite good pasture; but by sowing some better class of fodders and getting a bulk quicker, the benefit is so marked that it is very doubtful whether it pays to top-dress natural pasture at all.

Land that is sown with Subterranean clover, or, better, with Rye grass mixed with it, with a dressing of 45 per cent. super, at the rate of a bag to 2 acres, makes a wonderful pasture. This class of pasture shows improvement each year up to the fifth or sixth year, when it may be missed for one year, or, better still, be sown with a crop of oats, to get full value of the super used. Unless a paddock is dressed at least 3 times in succession, one does not get nearly the full value of labour. At the present time, super can be applied at less than 4s. per acre, and when put on sown pasture makes the improvement quite payable.

As for the methods to apply it, there is nothing equal to the drill or similar machines for even distribution, but for large areas in a short time a broadcaster on a motor lorry, and even on a light horse wagon is best; 40 acres can be dressed in a day. More than this could be done if the machine spread the distance advertised by the makers, but by driving too wide the area close to the machine is over-dressed, and where only the lumpy portion reaches there is not sufficient, and so leaves the growth very irregular. As for the time to apply, we start in February and continue through the autumn, to get the benefit of the super immediately the rains come, and in the early winter, when the feed is most necessary. We have dressed odd pieces much later, and they always show an improvement so long as there is plenty of moisture; but the earlier the better. As for the heavier classes of land, where cropping is carried on extensively, it is doubtful whether it pays to top-dress.

SIDE-LIGHTS AND SIDE-ISSUES OF PIG FARMING.

[J. T. RYAN, Mundalla.]

The purpose of this paper is to touch lightly a few of the lesser aspects of pig farming, points which in themselves are of little importance, but the sum total of which help a little in the better management of what can become an important sideline. The all-important factors of breeds, raising, feeding, housing and diseases of pigs have been purposely avoided.

"Figures talk" is no less true with stock raising than with banking. Apart from the owner's own interest and educational value, records of all costs and movements are essential when compiling statistics and income tax returns, and the time and worry of keeping such records is a hundredfold repaid for a few minutes spent each night, or twice weekly, recording the day's business.

Mr. Ryan's paper then continued in the form of a series of tables, compiled to show the methods adopted by him to keep a record of all business transactions connected with the breeding, feeding and marketing of pigs.

[*Papers Read at Conferences.*]

The first table, under the heading, "Census of Pigs," showed the number and type of pigs, such as boars, maiden sows, served sows, in-pig sows, dry sows, fattening sows, and pigs of various ages on either the first of the month or at weekly periods.

This was followed by a chart which gave details of the sale of pigs, and included the number sold, age, place and date of sale, agents, highest, lowest, and average prices, gross returns, average live weight, cost of freight and commission charges, yard fees, trucking, carting, insurance, feeding at abattoirs, total charges, and net returns.

The movements of the pigs for other than "sales" were also recorded by enumerating the dates of sales, and to whom sold. Described by Mr. Ryan as "a very essential chart" was a table which tabulated names, dates of service and farrowing, number in litter, and remarks. A simple chart followed. This described the breed and date of birth of the sow, its breeding, and the reason for its sale. A record which should prove of interest and help to breeders was one showing the litter records of the sows. This was plotted out to show the name and breed of the sow, the number of litter, and the number of pigs born and weaned in each litter.

Mr. Ryan considered that his next table, "the breeding summary and weight record of litters," was the most important record, even thought it necessitated the greatest amount of work. It made provision for the following details:—Name of sire and dam, age at service, number of litter, date of birth of same, number of pigs born, and mean and sexes, total weights, average weights, and the weights of weekly and average gains.

The paper then dealt very exhaustively with feeding, the writer setting out in additional tables the class of food, costs, &c., connected with this important aspect of pig raising. Referring to the value of various green fodders, Mr. Ryan gave the following information regarding crops he had grown for this purpose:—

Skinless barley and Berseem clover.—The finest quality, fastest growing early green feed possible to grow in this district.

Silver beet.—Too slow under other than garden conditions; not a success early or late sown.

Lucerne, sown in May.—Splendid germination and early growth, but checked by lucerne flea, and eventually overcome by weeds.

Phalaris and Cow grass.—More or less neglected, but both have possibilities.

Kale.—A hardy, fast grower, relished by pigs.

Pease and Cape Barley.—Splendid spring green feed, but later becoming too coarse. The best practice is to allow it to ripen, and then turn pigs on to it.

Sudan Grass, Imphee, Millets.—Poor germination through rain flooding, but then remarkable growth. Pigs preferred Sudan grass and millets.

[*Papers Read at Conferences.*]

Artichokes and Cattle Pumpkins.—Artichokes are the easiest sown and hardiest of all summer crops; best harvested by turning pigs on to them. Cattle pumpkins not a success under field conditions.

Lucerne, sown in October.—Splendid germination and growth, not worried by flea or weeds, outgrowing both. Recommend heavy spring sowings.

African Sorghum.—A very disappointing crop in early growth, but makes great headway in early winter, and lasts much longer into winter than other summer crops. Pigs like the succulent stalks, but dislike the leaves. This sorghum is extremely hardy, and has good possibilities on selected spots.

MAKESHIFT OR SUBSTITUTE APPLIANCES.

Weighing Scales.

Scales on a pig farm are as important as the measuring can in a dairy or the dairy scales, for unless one is an expert in estimating live-weight, one is only guessing, and when disapproving of prices received, unless one can state the exact weight, you will probably be forestalled by something of this sort, "Your pigs, though an attractive line, were over-weight. They should not be yarded dressing over 145lbs."

To be able to state that "the pigs weighed (live-weight) 180lbs., as compared with 185lbs. the previous week, and as they were the same line under same conditions and feeding, I am at a loss to understand the big difference in value," forces the agent to admit that the difference in price was caused by market fluctuations. Whilst this is not very satisfactory, it is certainly more substantial than to be told that the pigs were not this or that weight, leaving you with a doubtful mind as to whether they were or were not. Furthermore, if weight of litters, &c., food given, rate of growth, and other interesting data are to be kept, scales are an essential. Standard pig scales, however are fairly costly, and with the necessary building in, they are practically immovable, thereby necessitating the use of two sets of scales, for if all weighing is done upon the pig scales much inconvenience and double handling is caused. Therefore, the installation of proper pig scales is not advisable for a beginner.

An excellent makeshift, with most of the convenience of pig scales, plus the added value of being able to use them elsewhere, is found by placing ordinary wheat scales, as are used on most farms, in a race built of cyclone rail or stones. A crate measuring 3ft. high, 5ft. long, and 15in. wide, with three or four drop doors, is then placed upon the scales. Into this crate the pigs are driven, one or more at a time, depending upon the size or desire of the breeder. It is important to remember not to bolt the crate to the scales, otherwise the scales will soon be smashed. The scales are placed on blocks or a concrete bed. We estimate (conservatively) that over 2,000 pigs have been weighed on our scales, and although many were fighters and very rough, the scales are still in good order, and have been carted all over the farm.

Cook-house.

Where food is of doubtful quality it is always advisable to boil it. Raw foods, such as meat and potatoes, must be boiled. For large quantities—for instance, 5 or 6 sheep and a bag of barley—bucket boiling is out of the question. The installation of a boiler sufficiently large to accommodate the above quantity, plus the necessary building in and provision for the oven, makes the job fairly costly.

An excellent substitute is found by hanging several 40gall. drums in an old 2,000gall. tank. If the tank is in fair order it can be made both fly and fire-proof, and as the heat is more or less confined, this cook-house is reasonably economical on wood.

Water Troughs.

Water should never be withheld from pigs; therefore each yard or pen must have its own water trough.

[*Papers Read at Conferences.*]

To buy and instal water troughs is not inexpensive; to build concrete ones is costly, both for materials and time, and in most cases hard to keep clean.

A 40gall. drum cut in halves, or into three lengthways sections, makes ideal water troughs. Placed on four stubs in such a manner that they can be easily tipped up for cleaning purposes, and covered with hardwood, leaving only 2 8in. square openings for each section, they make troughs that in practice are second to none. Where upwards of 100 pigs, or even less, are running in a paddock the first section is provided with a ball-cock, and completely covered with wood; the other sections are connected by ¾in. or 1in. piping. In this case a tipping lid is made, so that the whole of the trough is exposed for cleaning purposes.

GATES.

Here is an item which, to the beginner, presents some costs. For size of opening provided, the cost of installation of factory-made pig gates is beyond all reason. The cheapest, easiest-opening and strongest gate is made from 3in. x 1in. hardwood, two pieces each end for uprights, the spacing for the 6 horizontal pieces being 2½, 3, 3½, 4, 6, and 6in. The spacing may be varied according to the height of the gate. The gate is strengthened with a cross piece. For hinges, 7-16in. or ½in. bolts (not pegs), with one end at right angles for 3in. bolted-through posts and fixed permanently with nuts have proved the best. A sheet steel box with an eye bolt through the centre is fixed to the gate in whatever position is handiest, and then the gate is simply dropped on to hinges. To prevent pigs from throwing the gate off its hinges, one of the right-angle bends is threaded so that a nut can be screwed on when the hinge is through the eye-bolt. This cannot be thrown off, no matter how determined the pig.

Where a large opening is wanted only occasionally, such as biennial thatching of the roof or the ploughing of the paddock, the cheapest and best gate is made by using Walker strainers on all 9 or 10 wires. A few minutes spent in undoing the strainers and throwing back the wire will make a large opening, which can be almost as quickly closed again.

In practice, on short strains of Cyclone the Walker strainers are essential, as short strains soon become very slack. They are quickly made taut again by this method.

It is evident that where other than very small numbers of pigs are kept any trouble not quickly checked might quickly develop into a serious problem.

PARASITES.

Apart from low prices, parasites, internal and external, present no small obstacle. The only internal parasite that caused us any real concern was the long round worm (*Ascarius suis*). After many experiments, oil of chenopodium proved the most effective remedy.

Weekly Application.—The external parasites which for some time caused most trouble and worry were fleas, mange and tick, in that order. For the purpose of this article the procedure has been reversed.

Although tick or lice are easy to kill with any oily mixture, mineral oils are by far the most satisfactory and economical, old sump oil from a car or tractor being 100 per cent. effective. In many piggeries tick continue to exist simply because the oil is not applied regularly enough.

A weekly application of sump oil for a few months will completely kill out this pest. However, our experience has been that sump oil, or any waste oil for that matter, has little or no curative effect upon mange, and does not even inconvenience the flea.

Mange, in many cases, is more unsightly than actually detrimental to the growth of the pig. Those lightly affected apparently receive no set-back, nor does the trouble always spread rapidly, although it may be of the sarcoptic type.

[*Papers Read at Conferences.*]

A mixture of raw linseed oil, good phenyle, and flowers of sulphur will always cure mange, and also kill any tick, and drive fleas off the animal, but it had no power of eradication of the fleas elsewhere than on the pigs. Furthermore, the mixture, although effective against mange and tick, is rather expensive when used extensively.

The flea is the greatest insect curse in a piggery. For a long time a losing fight was waged against this scourge. While many things would kill fleas or drive them off the pigs, it was a long time before anything was found to rid the pens or pig-houses of them.

Even such drastic agents as straw fires and boiling water, which would kill the adults by hundreds, were useless against the covered eggs and larvae, and the sheds were quickly re-stocked by the parasite. Cleanliness could not get rid of them any more than a clean paddock will rid one of rabbits. They and their breeding burrows must be directly attacked, and so it is with the flea.

So serious did the flea problem become that we seriously thought of abandoning this sideline. At that time the fleas were breeding in the sand in the open, and the position seemed hopeless.

After much experimenting and the use of different powders and mixtures it was found that a strong mixture of phenyle and rain water was as good as anything as a temporary measure of relief. This at its best merely would hold the enemy even.

With the idea of substituting crude oil for the more expensive raw linseed oil as an experiment upon mange, we mixed the crude oil and phenyle and omitted the flowers of sulphur. This we knew would kill the tick. The mixture proved successful upon the mange. It was remarkably more effective against the flea than anything else we had used, regardless of its expense.

A badly-infested shed was quickly and completely rid of fleas, and remained so for weeks. An accident to the phenyle tin temporarily forced us to use crude oil on its own, and, to our surprise, it proved a splendid remedy. Used through a force spray pump, crude oil is cheap, practical and remarkably effective against fleas, mange and tick.

That contention is best borne out by the fact that in our piggery of nearly 300 pigs there is not one tick, flea, or a sign of mange or any other skin trouble, and crude oil solely has been used for the past 18 months. A dry, clean dirt floor is preferred by pigs to any other, including well-strawed wooden floors.

While dirt floors are easily kept dry, it is not always so easy to maintain them in clean condition, free from vermin. We regarded that task as almost impossible, but crude oil solved the difficulty. All pens, houses and pigs are sprayed every three weeks.

This frequent treatment might appear expensive, quite apart from the results obtained. With any other method of application but a spray pump it certainly would be. Under test by this method 200 baconers were effectively covered with 2galls. of oil at a cost of 1d. for 7 pigs. We now use considerably less oil, as its spreading properties are remarkable, and it is effective in minute quantities. While crude oil improves the appearance of a coloured pig, it certainly does not add to that of the whites. Where desired, however, the oil is easily washed out with warm suds, leaving the skin and hair very white and clean. Crude oil, too, is harmless to pigs, except when it penetrates their ears under force, thereby causing them some inconvenience or slight suffering, but only for a few hours at the most.

Litters under 7 days have been sprayed without any harmful effects. We are decidedly of opinion that the spraying of a sow with crude oil prior to farrowing is as effective in the control of worms as is washing her with warm suds or an emulsion, and certainly it is ten times as practical.

We are using crude oil in the piggery for several other purposes, with apparently good results. Any reader doubting the ability of crude oil to kill fleas—for that matter, any insect—should smear a little upon them and see the result. We would like to emphasise, in conclusion, that crude oil is not waste or sump oil.

[*Papers Read at Conferences.*]

LOWER NORTH, BLYTH, 28th MARCH, 1935.

MARKETING OF FARM PRODUCTS.

[E. H. LANYON, Blyth.]

Although much time has been devoted to discussing methods of increasing production of the various classes of produce handled by farmers, a little attention could be given to the improvement in methods of marketing. Manufacturers of foodstuffs are compelled by law to guarantee the purity of their products under the Pure Foods Act, and the farmer must realise that the wheat he markets is to be the food of the people.

A great deal of work is put into preparing the land and treating the seed, but many farmers consider that so long as the wheat is in the bags it is fit for market. There is a tendency to-day to put wheat in second-hand bags that are far from attractive. Apart from the appearance of the sacks, the condition is so poor that they will barely stand handling and some are leaking wheat from badly repaired holes. Then there are farmers who do not consider the harm they are doing to their own market by allowing barley, turnip, or Star Thistle to be reaped with their wheat. It will be said that these are at times unavoidable, but it is not good policy to allow this to occur a second time without some steps being taken to eliminate foreign matter from other people's food. The farmer who allows loose earth and sometimes stones to be picked up and bagged with spilled wheat is gaining very little and doing a vast amount of harm to his future sales.

The weather at harvest time is not always what the farmer would desire, but with a little foresight the delivering of bags with wet and mouldy bottoms could be avoided. It is false economy to allow hundreds of bags of wheat to stand unsown in the paddocks waiting for a cool day to sow them. If labour is engaged to sow the wheat and also stack it off the ground, then the carting can be delayed indefinitely, but the quantity of wheat that is spoiled each time there is a heavy rain is much greater than one realises. There is also a danger of white ants attacking the bottoms of the sacks if left standing for any length of time in the paddocks. Careless harvesting can also spoil a good sample of wheat, either by cracking of grain, by improper thrashing, or leaving chaff in the wheat and so spoiling what would be an otherwise good sample.

It should not be necessary to mention bunt or smut, but unfortunately there are still farmers who neglect the proper pickling of seed and so deliver smutty wheat to market, and expect full price for it.

Should a farmer have the misfortune to have his crop pinched by rust or frost, he should be prepared to accept a reduced price, as the shipping of pinched wheat as f.a.q. will only damage future markets.

The Blyth Bureau has conducted Seed Wheat Competitions for about 10 years, the members submitting samples of seed which are judged on a system of points for freedom from weeds, dirt, chaff, and visible admixture; freedom from injury in harvesting; and for plumpness and evenness of grains. There has been a noticeable improvement in the wheat marketed in the Blyth district since the inception of these Competitions and the Branch is to be commended for their inauguration.

WOOL.

The second product of importance in this district is wool, and much could be said for the classifying of farmers clips of wool. If it pays the large pastoralists to engage experts to class their wool from thousands of sheep of an even line, it should also pay farmers to give more time to the classing of their clips.

The farmer who sells wool usually raises lambs for export market, and here again a little more care in the handling of the lambs could be exercised. It may be that the farmer himself is careful at home when picking out a line of lambs for trucking and then sends an inexperienced boy to the station with the lambs, where they are roughly handled in loading, which results in the carcasses being rejected.

[*Papers Read at Conferences.*]

In the Mid-North districts it is hard to keep suitable pasture for cows and so the maintaining of first grade cream or butter is a difficult matter, but it is possible to market the produce more often than is generally done and so obtain better returns.

The handling of eggs could also receive a little more care. The condition in which eggs and butter have been marketed in the past is the reason for the low prices offering for these products to-day, and if more care is given to these matters the results should be more satisfactory to all.

THE STATE'S PROBLEM OF LOW QUALITY WHEATS.

[W. J. MARSHMAN, Owen.]

From time to time in the press, warnings have been issued against the production of low quality wheats, and to the observant mind, these warnings are not to be taken lightly.

The Minister of Agriculture has spoken in no uncertain strain upon this matter, and his opinion has been backed up by the Director, the Principal of Roseworthy College, and by all members of the Agricultural Department. Besides the opinions of our agricultural heads in this and other States, there are the very strong views of the best millers, and even bank managers have become interested in the subject.

One very prominent bank manager of Melbourne has made the following statement in regard to the position in Victoria. He says:—"We are up against trouble with wheat quality following denouncement by the millers of 'Free Gallipoli' wheat for milling purposes. The matter is really a serious one and millers next year may decline to buy 'Free Gallipoli' or may pay 6d. per bushel below normal for it."

Recently at Canberra, the President of the Federal Millers' Association of the Victorian Wheatgrowers' Corporation Ltd., complained bitterly to one of the State Agricultural Directors of the low quality of some of the Australian wheat. They said it was really unsaleable in the British market, and was seriously handicapping millers in one State, both in regard to domestic and export production.

The Advisory Committee mentioned, even went so far as to approach the Federal Government with a request that steps be taken to prevent the cultivation of low quality wheats for inclusion in the f.a.q. standard.

The object of this article is not to create a panic amongst wheatgrowers, but to try and get them see the true perspective and with this idea in mind, seek the views of exporters and British millers. They too, have made most unfavourable comments regarding the inclusion of low quality wheat. One exporter states that he has a quantity of last season's f.a.q. wheat on hand, which contained a large percentage of Gallipoli. There is, he says, no sale for it in Great Britain, because it was below the standard of Australian quality, and because of the danger of weevil infestation, he was selling it in the Oriental market at reduced rates, other than bread making. This action, he says, tends to lower the value of all other Australian wheats.

The second exporter produced letters in Canberra from the manager of his London organization and managers of two of the leading British milling firms. These were all to the same effect, namely, that the wheat is below the recognised standard of Australian wheat and is not required even for fillers. Country millers will not touch it. It is not a question of price; they simply do not want it. Some has been sold for stock feed.

A similar position has arisen in the Argentine and Hungary. Very drastic legislative steps have been taken in these countries to raise the standard, and correct the trouble which has arisen as the result of the production of inferior quality, but high yielding wheats. Twenty-four varieties in Argentine have been suggested as unfit for milling. Prior to the Great War, Hungary produced wheats that were among the strongest in the World.

[*Papers Read at Conferences.*]

During the War, greater stress was laid upon quantity production, and quality was brushed aside for the soft wheat types with the big yellow kernels, with a high starch content, and a big wheat yield.

At the end of the War—when American hard wheats were again imported by the central European States—Hungary found itself in a difficult position, with large quantities of soft wheats on its hands, which nobody wanted in Europe, since every country in Europe produces enough soft wheat for its own requirements.

THE POSITION IN THE ARGENTINE.

In the Argentine a National Wheat Commission has been created which (1) controls the entire trade in grains; (2) shall establish certain wheat types for the various districts in accordance with the wheat production of those districts, and shall lay down the zones in which the different wheat types are to be produced; (3) the breeding stations may not distribute new grain varieties before the express permission of the Ministry of Agriculture has been obtained. The Ministry will then decide if, and in which districts of the country, the particular varieties may be cultivated; (4) the Ministry of Agriculture will permit the cultivation of new varieties only in those cases where the latter promises a decided improvement over existing types.

An Argentine report, dated 1st February, 1934, has reached Australia and extracts state that the position is extremely serious, and no longer can we assume that Australian wheat is required on the European market solely because of its colour, bloom and dryness.

The Director of Agriculture in Western Australia states:—"In the past the Departmental policy has been not to place any restrictions upon the varieties which farmers shall grow and shall be included in the f.a.q. standard. In future, owing to the position which has arisen, I feel that in Western Austsralia—and indeed throughout Australia—this policy cannot be pursued without injury to the wheat industry. Western Australia has grown thousands of acres of Gluclub, of about the same test and quality as Gallipoli, and the Department is doing all it can to discourage farmers from continuing with it. Last year the area under Gluclub was 316,830 acres.

In an article dated Adelaide, 7th January, the Minister for Agriculture said that at a conference of Ministers at Canberra it had been decided to advocate growing of higher quality varieties. All Agricultural Officers are much concerned about the position and are doing valuable educational work in this regard, and the Chemistry Department is testing wheat for milling quality.

Under the heading "Effort to Improve Quality of Victorian Wheat," Melbourne, 27th February, 1935, appears the following:—Declaring that it was a matter of vital importance to the community, the Premier (Sir Stanley Argyle) said to-day that he intended to have an immediate investigation made into the quality of Vctorian wheat. "I am strongly of opinion," he says, "that salvation for all producers lies in maintaining quality." "We have," he says, "produced the highest quality wool, and magnificent types of sheep, and have tried to build up the flocks and herds, and it is reasonable that we should see that the great importance of the wheat industry is not allowed to be affected by the breeding of an unsuitable quality of wheat."

Dr. Callaghan, Principal of Roseworthy College, says:—"From my personal contact with most of the millers of this State, I am perfectly satisfied that they are very sincere in their desire to obtain varieties of higher baking quality. It is evident, therefore, that there is a happy future for a variety or varieties of wheat possessing good quality provided they have yielding ability sufficient at least to compete with high yielding varieties of poorer quality."

Mr. A. R. Hickinbotham, Lecturer in Chemical and Physical Sciences, of Roseworthy College, says:—"The important constituent in bread making is the gluten, and each variety of wheat tends to have a characteristsic amount of gluten of a good or bad

[*Papers Read at Conferences.*]

quality. A large amount of good gluten allows the dough to absorb more water, and therefore makes more loaves for each bag of flour. It enables the loaf to stand up well, and hold more of the gas formed by the yeast, so that the loaf is larger and looks better, and it confers on the bread a more silky texture and resilient crumb.''

At present in the laboratories, the Department of Agriculture is testing thousands of varieties by the Pelshenke system, which is as follows:—A small amount of grain is ground into wholemeal, and to 5 grams of the meal 2.5 per cent. of a 10 per cent. solution of yeast is added. This is mixed and kneaded with the meal, and rolled into a ball, and placed in a vessel or beaker containing water held at 31°C. The ball sinks, but, as gas is evolved by the action of the yeast, it rises and expands, and finally ruptures and falls to the bottom. The time from when the ball is placed in the beaker to when it breaks is given as the Pelshenke test figure. The higher the figure, the better the quality.

Taking Gallipoli grown in South Australia and Victoria, and Gluclub in Western Australia, the tests of these varieties are very low indeed, ranging from 23 to 27. The popular Nabawa also shows a very poor test from 31 to 41 according to rainfall and soil conditions. Gluyas Early, another poor quality wheat, as low as 26 in the Laura district and about 35 at Roseworthy; King's White, about 37.

In the writer's opinion, it might be well for us to seek for varieties of a higher milling quality, such as Dundee, with a test of 60; Aussie, 117; Crostam, 65; Ford, 60 to 80; Ranee 4H averages between 50 and 60; Sword very irregular, but some tests according to selection showing as high as 58 and 60.

It is difficult to lay down a hard and fast rule as to what should be the minimum as regards test. Personally I would say about 50, and in seeking to remedy the difficulties confronting us, whatever courses we adopt, the improvement of our f.a.q. qualities can only be gradual.

The Remedy.

Firstly, let us cut out altogether growing those varieties of very low gluten content that have placed us in the present difficult position.

Secondly, let us seek amongst those varieties that do show better milling qualities (and there are quite a number of them) for wheats suited to the various districts that will tend to raises the present f.a.q. standard.

In the third place, let no new variety be issued by the Department of Agriculture that does not come up to the desired standard as set by the Minister or Director of Agriculture for general cultivation.

Whatever standard might be fixed for home consumption, let us see to it that a genuine and earnest effort is made to improve on the present low quality of many of the Australian types of wheat for export overseas.

MIXED FARMING.

[H. Bradley, Owen.]

With wheat at such a low price the present-day farmer is at a loss to know what to do for the best. A short time ago the Premier said ''Grow more wheat,'' and at that time the G.P.O. stamp had this wording. Farmers grew more wheat, and the result was by no means satisfactory.

It is necessary to go further back to discover the fault which was made by an overseas country. By holding back their wheat exorbitant prices resulted. European countries commenced wheat growing in order to keep their people, and so brought about over-production. Prices which only about 10 years ago were in the vicinity of 5s. 6d. per bushel (Australian quotation) have now come down below normal, and farmers must do something different in order to bring about a lower wheat production. We can grow more oats and barley. These have proved fairly satisfactory methods. One

[*Papers Read at Conferences.*]

thing in their flavour is the very high yield which can be obtained, but only through thorough working operations. With wheat at 2s. 6d. per bushel it can be grown with profit, providing, of course, that the land be freehold.

In almost every district farmers are being sold up, either by misfortune or bad management. However, there are quite a number who have not given up in despair. They have adopted another method, namely, mixed farming. These last few years the farmer who has adopted mixed farming is doing the best thing. Certainly, there is not much to be had from the sidelines, but every little helps.

Wheat Growing.

Take, for instance, a man who has a holding of 600 acres. He could have 150 acres under wheat, 150 fallow, leaving 300 acres for oats and barley. In this district, where the average yield is around 15bush. per acre, the crop on 150 acres would turn in 750 bags; take 75 bags out of this for seed and 25 for fowls, the farmer could sell 650 bags, which at 2s. 6d. a bushel would be worth £243 15s. 6d. Out of this amount must be taken the cost of 8 tons of superphosphate £32, cornsacks £22. For the power farmer, £35 for fuel, working expenses, interest on capital and depreciation on plant should not be more than £130, leaving the farmer with £24 15s. approximately.

The best practice is to plough a piece of ground for the cereal crops. Most farmers have a tendency to slum this part of their work, and about seven out of ten farmers in this district drill oats and barley on land which has been previously cropped with wheat. This is not sound, and more than once it has been a complete failure. For instance, a farmer, after burning off the wheat stubble, waited for a rain and drilled with oats. When harvest came they were hardly worth reaping, the yield being about 2 to 3 bushels.

Another sowed oats on fallow. They yielded 30bush. per acre. There are, of course, exceptions. I have seen 30bush. oat crops on stubble, but it is unusual in this district. It is suggested that a farmer plough up 100 acres with the first rains, then harrow and drill oats, sowing 60lbs. seed and 90 to 120lbs. super. Fifty acres of oats are all that is required for hay for cows, and some to reap for seed.

Barley in its turn is another source of income, and on the remaining 50 acres of early fallow sow malting barley. This, sown at the rate of 40-60lbs. per acre and formalin-pickled should, under average conditions, yield from 21 to 50bush. per acre. Ninety pounds of super are necesary for good results. After reaping, put 150 bags in the barn; 25 bags are enough for seed for the next crop, leaving 125 for pigs, and carry over if necessary. This should leave the farmer with 100 bags to sell. Two hundred acres are left on which to run sheep and cows, having, of course, 150 acres of fallow for the forthcoming crop. With 200 acres left the farmer can comfortably feed 8 cows and 50 ewes.

[*Papers Read at Conferences.*]

SHEEP.

Large-framed plain-bodied Merinos are the best breed for fat lamb raising. If possible, the selection should be made from a flock of 100 or more, for by so doing the desired type could be picked. It would pay for the trouble, even if the seller wanted 2s. a head more. This class of ewe, mated with the Dorset, Lincoln, or Southdown ram, will give excellent results. Moreover, the lambs by these rams out of the Merino plain-bodied ewe will not be wrinkly, and if fed properly on good grazing land, will turn in a price exceeding by far that for the pure Merino lamb.

To illustrate the importance of fat lamb raising, I give the following account of my experience. In January, 1934, I bought a line of 50 Merino ewes out of a flock of 150. They had been mated to Dorset and Suffolk rams. On arriving home with them I breeched them and turned them on the stubble, where they stayed until lambing. Owing to late rains I was unable to paddock them for about a fortnight, so fed them on chaff. At the end of four months lambs averaged £1 0s. 3d. a head at the Abattoirs. I kept the ewes on grass until shearing. They were shorn in September, and at one of the early wool sales the fleece wool was sold at 8½d. lb. Here again I would advise farmers not to put woolly or shorn sheep on fallow. It is not sound practice. Before shearing, if sheep have been turned on fallow, they are always full of dust, and after shearing the wool is coated with dust. If farmers want a good price for their wool they must take care of it and not neglect the sheep.

If lamb raising and wool growing are to be carried out with success every effort on the farmer's part should be made to secure good prices. I suggest that the 2, 4, and 6-tooth ewes be kept for the purpose of lamb raising and wool growing, and as they rise "full mouth" sell them and buy young ewes to take their place. It is a good plan to shear before barley grass seeds fall. This seed in particular is bad for the sheep.

Two years ago sheep which had been grazing on barley grass until the seeds fell were shorn. They were crippled and in some instances the seeds had pierced under the flap in the sheeps' eyes which temporarily blinded them.

In the last few years flies have been a menace to sheep. If possible, it is a good plan to breech twice a year. This eliminates the pest considerably. After shearing, flies seem to be at their worst, and the only thing to do is to keep them as clean as possible, and use good fly oil. Cooper's milk fluid is a very effective disinfectant.

PIGS.

I favour the Large White for breeding. A pure-bred boar crossed with sows of the same breed or half-bred sows are very successful crosses, and if the sows are not too weighty, they have a better chance of rearing big litters. Pigs which do not have milk as part of their diet lack bloom. Here is the only place where cows are a little profit to the farmer. They do not pay for the food they eat, apart from providing milk for pigs. Four breeding sows are enough for the farmer to care for, and they should average two litters a year each. A fortnight before a sow farrows it should be fed mostly on milk and other slop foods, and when a sow has farrowed, feed on 1½ to 2galls. of skim milk mixed with two double handsful of bran and just a little barley for each feed. Feed three times a day. When suckers are three to seven weeks old they look for feed apart from the sow, and milk and soaked barley is their main diet. At eight weeks they are fit to sell, and at present prices should be worth 12s. to 18s. each.

POULTRY.

Lately egg prices are a little firmer, and if eggs are cheap, a certain amount of profit can be made. The average farmer feeds his fowls on wheat all the year round, whereas if he went to a little more trouble and fed them on a pollard and green feed mash in the morning and wheat at night he would gather more eggs at the end of the day. The White Leghorn seems to be the most popular breed; 100 laying hens is quite a handy number in conjunction with the other sidelines.

(*To be continued.*)

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co. reported on 1st May, 1935, as follows:—

BUTTER.—The beneficial rains during April very much improved the outlook for dairying in this State, and in most areas the feed is showing up nicely. As a result, production is moving upward and the cream supplies to the factories have not only improved in quantity, but also in quality. There is now sufficient local choicest butter for trade requirements and a surplus of first and second grades, so that increasing quantities will be exported from this outlet. Values have continued steady in the Adelaide markets, but there was a slight improvement in London rates. Present local values are:—Choicest creamery fresh butter, in bulk, 1s. 4½d.; prints and delivery extra. (This price is for local sale only and, under the quota system, the equalised price manufacturers will receive will be 11.875d. per lb., on which basis payments to cream suppliers will be calculated. Separator lines, from 9d. to 1s. 1d. for choicest; stores, 6d. to 8d. per lb. (These prices are subject to equalisation levies.)

CHEESE.—In the South-East conditions are very favourable and the minimum of production was reached last month, and milk supplies are now increasing. Rates have continued steady and good clearances were effected from week to week. Values are:—Large and medium, from 8½d. per lb.; loaf, from 9d. per lb., at store door, delivery extra; semi matured and matured, 10d. to 10½d per lb.

EGGS.—As is usual at this time of the year supplies are very short, but they are more than sufficient for local needs so that shipments have been made to Sydney fairly regularly. As in most areas the moulting of the birds took place early it is expected that an increase in production will result earlier than usual this year. Present rates are:—Ordinary country eggs, fair average quality, 11d. per doz. net; long distance rail or shipping eggs, lower; selected new laid clean eggs, 1⅞ozs. and over, to 1s. 2½d. per doz. net.

BACON.—All consignments met with steady turnover throughout the month and consumption has improved. Rates remain unaltered at:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 9d. to 9½d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 3d. to 1s. 4d. per lb.

ALMONDS.—Heavy supplies were marketed throughout April, but interstate and local trade readily absorbed all that were offering and demand still continues satisfactory at:—Softshells and Brandis, 8½d. to 9½d. per lb.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 10d. to 1s. 11d. per lb.

HONEY.—The stocks on hand from last season are still heavy and market is somewhat dull. Sales have hardly kept pace with the incoming consignments and values are without change, being:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades, 1d. to 2d. per lb.

BEESWAX.—Met with ready sale at quotations:—1s. 4d. to 1s. 4½d. per lb., according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Wednesday, Thursday, and Friday and our sale rooms are the best equipped in South Australia. Clearing sales arranged in any part of the State. As is usual after the Easter sales, supplies fall back and values for some lines improve. Much heavier quantities could be placed satisfactorily and, therefore, we advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 3s. to 4s.; nice conditioned cockerels, 2s. 6d. to 2s. 11d.; fair conditioned cockerels, 1s. 9d. to 2s. 5d.; chickens, lower; heavy weight hens, 2s. 6d. to 3s. 3d.; medium hens, 2s. 1d. to 2s. 5d.; light hens, 1s. 9d. to 2s.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 3s. to 4s.; young Muscovy ducks, 2s. to 2s. 9d.; ordinary ducks, 1s. to 2s.; ducklings, lower; geese, 2s. 6d. to 3s. 6d.; goslings, lower; turkeys, good to prime condition, 8d. to 10½d. per lb. live weight; turkeys, fair condition, 6d. to 7½d. per lb. live weight; turkeys, poor and crooked breasts, lower; pigeons, 2½d. to 3½d. each.

POTATOES.—New season's, 7s. 6d. per cwt.

ONIONS.—New season's, 8s. 6d. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING MARCH, 1935.

IMPORTS.

Interstate.

Apples (bushels)	587
Bananas (bushels)	14,557½
Citrus—	
Grape Fruit (bushels)	3
Lemons (bushels)	3
Oranges (bushels)	252
Passion Fruit (bushels)	22½
Peaches (bushels)	7
Pears (bushels)	3
Pineapples (bushels)	1,198½
Tomatoes (bushels)	97
Peanuts (bags)	75
Peanuts, Kernels (bags)	51
Beans (bushels)	2
Cucumbers (bushel)	1
Onions (package)	1
Peas (bags)	3
Potatoes (bags)	320

Bulbs (packages)	70
Plants (packages)	27
Seeds (packages)	44
Wine Casks (No.)	1,867
Fumigated—	
Plants (packages)	4
Wine Casks (No.)	4
Rejected—	
Bananas (bushels)	33
Citrus—	
Oranges (bushels)	32
Pineapples (bushels)	12
Tomatoes (bushel)	1
Plants (packages)	1
Second-hand bags (No.)	175

Overseas.

(State Law.)

Wine Casks (No.)	948
Fumigated—Wine Casks (No.)	25

Federal Quarantine Act.

	Packages.	lbs.
Seeds, &c.	2,633	475,049
Canes	183	—
Cocoanut chests	388	—
Tea Chests	2,550	—
Plants	1	6 (No.)
Timber	216,833	7,274,543 sup. ft.

EXPORTS.

Federal Commerce Act.

		Packages.
Egypt	Apples	200
England	Apples	83,717
	Grapes	100
	Pears	10,146
Germany	Apples	10,907
India	Apples	1,769
	Citrus—Lemons	2
	Grapes	210
	Peaches	46
	Pears	45
	Plums	2
	Quinces	50
	Vegetables	5[illegible]

		Packages.
Netherlands, East Indies	Apples	150
	Vegetables	2
New Zealand	Seed—Subterranean Clover	425
Norway	Apples	400
Scotland	Apples	8,907
Singapore	Apples	160
	Citrus—Lemons	3
	Peaches	9
	Pears	115
	Vegetables	58
Straits Settlements	Vegetables	6
Sweden	Apples	32,600

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of April, 1935, also the average precipitation for April, and the average annual rainfall.

Station.	For April 1935.	Av'ge. for April	To end April, 1935.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0·02	0·23	1·04	4·66
Marree	—	0·39	0·75	5·88
Farina	0·16	0·45	1·03	6·43
Copley	0·26	0·57	0·80	7·87
Beltana	0·44	0·55	1·03	8·48
Blinman	0·33	0·81	0·77	11·86
Hookina	0·30	0·67	1·41	11·25
Hawker	0·45	0·90	1·50	12·26
Wilson	0·37	0·85	1·78	11·79
Gordon	0·38	0·52	1·53	10·53
Quorn	0·86	0·91	1·41	13·22
Port Augusta	0·85	0·76	3·64	9·44
Bruce	0 61	0·49	2·10	9·87
Hammond	0·47	0·85	2·60	11·21
Wilmington	0·74	1·34	2·60	17·32
Willowie	0·66	0·72	2·65	12·25
Melrose	1·66	1·63	5·66	22·88
Booleroo Centre	1·19	1·15	3·50	15·21
Port Germein	1·40	1·10	3·58	12·53
Wirrabara	1·76	1·44	4·34	19·29
Appila	1·37	1·16	4·77	14·65
Cradock	0·54	0·74	1·65	10·82
Carrieton	1·15	0·78	2·28	12·23
Johnburg	0·73	0·65	1·70	10·58
Eurelia	0·58	0·84	1·74	12·79
Orroroo	0·62	0·92	2·32	13·20
Nackara	1·85	0·58	2·50	11 09
Black Rock	0·80	0·86	2·01	12·37
Oodlawirra	1·03	0·70	2·16	11·68
Peterborough	0·79	0·92	3·15	13·22
Yongala	1·20	1·04	3·31	14·44
North-East.				
Yunta	2·01	0·57	2·43	8·55
Waukaringa	0·98	0·52	1·64	7·94
Mannahill	0·57	0·54	1·11	8·20
Cockburn	0·60	0·58	1·02	7·96
Broken Hill, N.S.W.	0·75	0·71	1·25	9·56
Lower North.				
Port Pirie	1·00	1·17	5·14	13·21
Port Broughton	1·32	1·19	5·78	13·88
Bute	1·51	1·25	3·18	15·44
Laura	1·91	1·43	5·47	17·95
Caltowie	1·11	1·26	4·29	16·74
Jamestown	1·37	1·26	3·84	17·69
Gladstone	1·62	1·33	5·62	16·29
Crystal Brook	2·45	1·24	7·48	15·78
Georgetown	1·72	1·50	5·27	18·37
Narridy	1·30	1·26	4·76	15·82
Redhill	1·50	1·33	5·41	16·59
Spalding	1·86	0·99	5·10	18·88
Gulnare	1·28	1·05	4·60	18·68
Yacka	1·25	1·17	4·35	15·39
Koolunga	1·36	1·16	4·66	15·38
Snowtown	1·67	1·26	4·51	15·74

Station.	For April 1935.	Av'ge. for April	To end April, 1935.	Av'ge. Annual Rainfall.
Lower North—*continued.*				
Brinkworth	1·97	0·90	5·42	15·82
Blyth	2·44	1·33	6·22	16·78
Clare	2·54	1·94	6·76	24·51
Mintaro	3·23	1·53	6·90	23·42
Watervale	3·02	2·21	8·11	26·80
Auburn	1·94	1·81	6·47	23·98
Hoyleton	2·17	1·46	5·76	17·33
Balaklava	1·87	1·38	4·73	15·46
Port Wakefield	2·36	1·12	4·48	12·94
Terowie	0·93	0·89	2·48	13·35
Yarcowie	1·15	0·95	3·06	13·59
Hallett	1·78	1·13	4·90	16·46
Mount Bryan	1·48	0·94	4·66	16·83
Kooringa	1·29	1·20	3·84	17·85
Farrell's Flat	1·64	1·41	4·24	18·61
West of Murray Range.				
Manoora	1·91	1·31	5·47	18·92
Saddleworth	1·62	1·62	5·45	19·60
Marrabel	1·56	1·59	5·22	19·96
Riverton	1·63	1·70	6·04	20·81
Tarlee	1·75	1·47	4·20	18·10
Stockport	2 47	1·30	4·97	16·93
Hamley Bridge	1·95	1·34	4·53	16·54
Kapunda	1·40	1·56	4·04	19·79
Freeling	2·02	1·37	5·43	17·83
Greenock	1·44	1·61	4·87	21·53
Truro	1·52	1·49	4·35	19·89
Stockwell	1·61	1·55	4·40	20·13
Nuriootpa	1·74	1·55	5·12	20·72
Angaston	1·87	1·66	4·67	22·42
Tanunda	1·82	1·70	5·66	22·02
Lyndoch	2·23	1·67	5·16	23·40
Williamstown	2·04	2·04	5·47	27·77
Adelaide Plains.				
Owen	1·63	1·16	4·49	14·66
Mallala	1·19	1·34	3·37	16·56
Roseworthy	1·42	1·38	4·47	17·40
Gawler	1·27	1·56	4·10	18·91
Two Wells	2·93	1·33	6·33	15·75
Virginia	1·46	1·35	4·71	17·18
Smithfield	1·32	1·10	4·95	17·64
Salisbury	1·40	1·55	4·96	18·56
Adelaide	1·66	1·72	4·92	21·15
Glen Osmond	1·81	2·03	5·42	26·05
Magill	1·90	1·95	5·61	25·53
Mount Lofty Ranges.				
Teatree Gully	2·24	1·90	6·68	27·20
Stirling West	3·76	3·57	10·75	47·08
Uraidla	2·89	3·21	9·04	44·19
Clarendon	1·98	2·72	7·24	32·88
Happy Val'y Res.	1·86	—	5·32	—
Morphett Vale	1·76	1·81	4·80	22·66
Noarlunga	1·22	1·63	4·21	20·37
Willunga	2·35	1·92	5·62	26·02
Aldinga	1·37	1·46	3·96	20·27

RAINFALL—*continued.*

Station.	For April 1935.	Av'ge. for April.	To end April, 1935.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	3·04	1·66	6·73	29·50
Inman Valley	3·70	—	6·74	20·68
Yankalilla	2·03	1·60	4·02	22·83
Mount Pleasant	2·71	1·98	4·93	27·23
Birdwood	2·44	2·04	6·01	29·21
Gumeracha	2·44	2·44	6·53	33·41
Millbrook Res.	2·77	1·72	8·05	34·68
Tweedvale	2·60	2·53	6·99	35·99
Woodside	2·60	2·17	5·90	32·31
Ambleside	2·66	2·43	6·78	34·90
Nairne	2 91	2·05	6·33	28·22
Mount Barker	3·07	2·22	6·76	31·31
Echunga	3·29	2·50	7·60	33·30
Macclesfield	3·20	2·25	6·61	30·43
Meadows	2·82	2·78	7·16	36·16
Strathalbyn	1·88	1·37	3·92	19·31
MURRAY FLATS AND VALLEY				
Meningie	1·57	1·44	3·80	18·37
Milang	1·42	1·21	3·15	14·91
Langhorne's Ck.	1·82	1·11	3 54	14·87
Wellington	1·44	1·17	3·92	14·65
Tailem Bend	1·57	0·75	4·06	15·06
Murray Bridge	1·44	1·09	2·98	13·56
Callington	1·76	1·09	3·00	15·19
Mannum	1·76	0·99	3·09	11·49
Palmer	2·02	0·87	3·08	15·63
Sedan	1·40	0·87	2·24	12·11
Swan Reach	0·85	0·52	1·94	10·64
Blanchetown	0·79	1·00	1·81	11·01
Eudunda	2·01	1·32	4·69	17·17
Pt. Pass	1·48	0·95	4·24	—
Sutherlands	0·46	0·60	1·90	10·84
Morgan	0·67	0·61	1·72	9·17
Waikerie	1·09	0·53	2·28	9·65
Overland Corner	0·51	0·75	1·67	10·32
Loxton	0·74	0·48	2·09	11·54
Berri	1·42	0·47	3·06	10·17
Renmark	2·12	0·64	3·37	10·41
WEST OF SPENCER'S GULF				
Eucla	0·80	1·04	5·32	9·96
Nullarbor	0·77	0·63	3·62	8·81
Fowler's Bay	1·07	0·85	3·55	11·94
Penong	1·09	0·82	3·49	12·27
Koonibba	1·26	0·66	4·15	12·13
Denial Bay	0·71	0·87	3·13	11·36
Ceduna	1·00	0·57	3·78	10·16
Smoky Bay	0·89	0·58	3·38	10·53
Wirrulla	0·73	0·53	4·69	10·54
Streaky Bay	1·35	0·97	4·80	14·88
Chandada	0·61	—	3·81	—
Minnipa	0·89	0·68	3·94	14·06
Kyancutta	1·04	—	4·40	—
Talia	0·44	0·63	3·17	14·76
Port Elliston	1·21	1·04	4·34	16·54
Lock	1·60	0·75	4·40	16·52
Mount Hope	1·08	—	3·07	—
Yeelanna	1·78	0·75	4·11	15·94
Cummins	1·28	0·75	3·51	17·60
Port Lincoln	0·98	1·41	3·09	19·42
Tumby	1·08	0·85	2·72	14·12
Ungarra	1·27	0·77	3·57	16·85
Port Neill	2·08	0·70	3·34	13·09

Station.	For April, 1935.	Av'ge. for April.	To end April, 1935.	Av'ge. Annual Rainfall.
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	2·79	0·93	4·54	12·65
Rudall	2·03	0·86	4·33	12·64
Cleve	3·06	1·13	5·37	14·83
Cowell	1·45	1·11	3·20	11·07
Miltalie	3·09	1·15	5·82	13·67
Mangalo	2·35	0·87	4·76	13·91
Darke's Peak	2·14	0·77	4·85	15·18
Kimba	1·46	0·79	3·97	11·82
YORKE PENINSULA.				
Wallaroo	1·44	1·26	4·94	13·98
Kadina	1·72	1·44	4·96	15·64
Moonta	1·77	1·44	3·88	15·06
Paskeville	1·26	1·23	3·68	15·49
Maitland	1·91	1·69	5·53	19·90
Ardrossan	1·34	1·16	3·16	13·97
Port Victoria	0·87	1·30	2·92	15·44
Curramulka	1·32	1·27	3·10	17·87
Minlaton	1·49	1·38	3·21	17·79
Port Vincent	1·29	0·87	2·71	14·43
Brentwood	1·46	1·07	3·08	15·55
Stansbury	1·13	1·26	2·68	16·82
Warooka	1·13	1·31	2·52	17·49
Yorketown	1·82	1·28	3·79	16·88
Edithburgh	0·98	1·34	2·61	16·37
SOUTH AND SOUTH-EAST.				
Cape Borda	2·04	1·85	4·59	24·82
Kingscote	1·24	1·38	2·80	19·14
Penneshaw	2·03	1·21	3·88	18·92
Victor Harbour	1·83	1·59	3·94	21·37
Port Elliot	2·56	1·53	4·17	19·93
Goolwa	1·67	1·34	3·56	17·85
Maggea	0·86	0·62	2·23	10·04
Copeville	1·16	0·47	2·77	11·51
Claypans	0·95	0·46	2·21	10·38
Meribah	0·80	0·93	2·39	11·31
Alawoona	0·90	0·63	2·10	10·36
Caliph	1·02	—	2·17	—
Mindarie	1·02	0·54	2·34	12·21
Sandalwood	1·30	0·50	2·92	13·66
Karoonda	1·06	0·65	3·24	14·36
Pinnaroo	0·64	0·78	1·86	14·43
Parilla	1·31	0·78	2·74	13·82
Lameroo	1·02	1·02	2·50	15·97
Parrakie	1·44	0·70	3·76	14·62
Geranium	1·55	0·94	4·10	16·51
Peake	1·49	0·81	4·81	16·01
Cooke's Plains	1·41	1·10	3·73	15·30
Coomandook	1·39	1·00	3·81	17·09
Coonalpyn	1·59	1·35	4·62	17·61
Tintinara	1·59	1·31	4·78	18·71
Keith	1·42	1·11	3·65	17·92
Bordertown	1·16	1·55	4·27	19·21
Wolseley	1·37	1·52	3·90	18·49
Frances	2·13	1·42	5·08	20·11
Naracoorte	2·31	1·73	6·32	22·66
Penola	2·17	1·85	6·28	26·01
Lucindale	2·41	1·77	6·53	23·34
Kingston	2·55	1·80	5·14	24·28
Robe	1·81	1·74	4·90	24·67
Beachport	2·07	1·89	5·36	27·09
Millicent	2·95	2·31	7·27	29·79
Kalangadoo	2·72	2·04	7·30	32·28
Mount Gambier	2·71	2·32	6·88	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings. May	Dates of Meetings. June
Adelaide	—	—	—
Alawoona	—	—	—
Allandale East	—	17	14
Alma	—	—	—
Appila-Yarrowie	—	3	7
Arthurton	1299	—	—
Ashbourne	—	15	12
Auburn Women's	—	31	R
Balaklava	—	26	23
Balhannah	—	—	—
Balhannah Women's	—	—	—
Balumbah	—	—	—
Balumbah Women's	—	1	5
Baroota	—	13	10
Beetaloo Valley	—	13	17
Belalie Women's	—	14	11
Berri	—	14	11
Belvidere	—	—	—
Blackheath	—	23	20
Black Rock	—	—	—
Black Springs	—	14	11
Blackwood	—	13	10
Blyth	—	24	28
Booborowie	—	13	17
Booleroo Centre	—	17	14
Boolgun	—	—	—
Boor's Plains	1299	2	6
Boor's Plains Women's	—	—	—
Borrika	—	—	—
Bowhill	—	13	17
Brentwood	—	2	6
Brinkley	—	15	12
Brinkworth	—	13	17
Brownlow	—	15	12
Buchanan	—	—	—
Bute	—	16	20
Butler	—	—	—
Caliph	—	7	4
Caralue	—	15	12
Carey's Gully	—	6	3
Carrow	—	15	12
Ceduna	—	—	—
Chandada	—	—	—
Chapman's Bore	—	20	17
Charra	—	—	—
Cherry Gardens	—	18	15
Chilpuddie Rock	—	—	—
Clare Women's	—	4	—
Clarendon	—	13	15
Cleve	—	4	1
Collie	—	1	5
Coomandook	—	31	28
Coonawarra	—	23	20
Coonawarra Women's	—	15	19
Cummins	—	10	14
Cungena	—	2	6
Currency Creek	—	20	17
Dudley	1296	—	—
Echunga	1304	8	12
Elbow Hill	—	16	13
Eudunda	—	6	3
Eurelia	—	11	8
Eurelia Women's	—	1	5
Farrell's Flat	—	31	28
Finniss	—	—	—
Frances	—	—	—
Frayville	—	—	—
Gawler River	—	—	—
Georgetown	—	18	15

Branch.	Report on Page.	Dates of Meetings. May	Dates of Meetings. June
Geranium	—	25	29
Gladstone	—	17	14
Gladstone Women's	—	14	18
Glencoe	—	14	11
Goode	—	—	—
Goode Women's	—	—	—
Greenock	—	20	17
Green Patch	—	16	13
Gumeracha	—	13	17
Hanson	—	14	11
Hartley	—	15	12
Hindmarsh Island	—	—	—
Hope Forest	—	6	3
Hope Forest Women's	—	—	—
Hoyleton	—	20	17
Inman Valley	—	18	20
Jamestown	—	15	19
Jervois	—	9	13
Kalangadoo Women's	—	11	8
Kalangadoo	—	11	8
Kalyan	—	15	19
Kangarilla Women's	—	16	20
Kanni	—	—	—
Kapinnie	—	—	—
Kapunda	—	10	14
Karoonda	—	15	19
Keith	—	16	13
Kelly	—	4	1
Ki Ki	—	—	—
Kilkerran	—	—	—
Kongorong	—	13	17
Koolunga	—	—	—
Koonunga	—	—	—
Koppio	—	15	19
Kringin	—	20	17
Kulkawirra	—	14	11
Kyancutta	—	7	4
Kybybolite	—	14	18
Kybybolite Women's	—	—	—
Lameroo	—	18	15
Langhorne's Creek	—	15	12
Laura	—	31	29
Laura Bay	—	—	—
Laura Bay Women's	—	14	11
Lenswood and Forest Range	—	—	—
Light's Pass	—	—	—
Lipson	—	18	15
Lone Gum and Monash	—	16	20
Lone Pine	—	13	17
Longwood	—	—	—
Lowbank	—	15	12
Loxton	—	10	14
Lyndoch	—	14	11
McLaren Flat	—	—	—
McLaren Flat Women's	—	2	6
Macclesfield	—	16	20
MacGillivray	—	14	11
Mallala	—	20	17
Maltee	—	16	13
Mangalo	—	—	—
Mangalo Women's	—	8	12
Marama	—	—	—
Meadows	—	15	12
Milang	—	18	15
Millicent	—	31	28
Millicent Women's	—	—	—
Miltalie	—	18	15
Monarto South	—	—	—

INDEX TO BUREAU REPORTS—*continued.*

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Rendelsham ...	11/4/35	8	Address—A. L. Warren .	F. Todd, jun.
Tantanoola	6/4/35	10	Paper from *Journal*	L. J. C. Osborne
Allandale East .	12/4/35	9	S.E. Conference Delegates' Report	R. T. Laslett
Mount Gambier	12/4/35	21	Discussion	J. E. Morphett

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wilmington	9/4/35	14	Question Box and Address —E. L. Orchard	Chas. Cole
Appila	3/4/35	11	"Farm Blacksmith Shop," C. W. Wurst	E. H. Wurst
Yandiah	12/4/35	12	"Correct Engine Lubrication," H. M. Kupke	O. Borgas
Black Rock	1/4/35	13	Address—C. A. Goddard	R. E. Kitto
Murraytown ...	23/3/35	19	Harvest Reports	E. B. Pitman

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Narridy	6/4/35	30	Address—E. L. Orchard .	J. Klingner
Baroota........	8/4/35	13	Address—E. L. Orchard .	E. W. Hulster
Redhill	16/4/35	10	"Breeding Seed Wheat," A. Hannaford	S. A. Pengilly
Wandearah.....	16/4/35	14	Address—E. L. Orchard .	L. A. Jacobs
Snowtown......	23/4/35	11	Address—C. A. Goddard	A. R. Hocking

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

ROTATION OF CROPS.

[*Paper read by Mr. D. Telfer at a meeting of the Dudley Branch held on March 19th.*]

Attendance: 12.

There is scarcely a text-book on agriculture, no matter in what country it was written, which does not devote a chapter to this important subject. It is regarded by the writers, be they English, Americans, New Zealanders, or Australians, as quite as important a part of agricultural practice as fallowing or manuring. They do not all advocate the same rotations, but they all agree on several points, and it is worth while to consider them.

First, they observe that when land is first opened up no attempt is usually made at any rotation, while in older countries fairly complex rotations are very strictly adhered to. Some indeed go so far as to say that the state of development of agricultural practice in any State or district is indicated by the complexity of the rotation generally adopted. In other words, they say that if no rotation was practised, it is a sign that the farming methods were primitive.

There are several reasons why rotations are important, but some of these certainly do not apply here. In England, for instance, the rotation is turnips, barley, clover, wheat, and one of its main virtues is that barley and wheat take their nutriment and moisture from fairly deep down, while turnips and clover feed only in the surface layers of the soil, and thus the soil is used up more evenly. But here we are restricted to winter growing crops and for the most part to cereals, and so we cannot avoid feeding fairly constantly on the same layers of soil.

Again, it is said that by growing a variety of crops work is more evenly distributed throughout the year. In rich, irrigated areas, such as parts of the South-East, where summer crops can be grown, this is certainly so but under our conditions the thing which more than any other, makes it difficult to follow a definite rotation is that we do not always get good early rains to enable us to work up stubble land.

Again, where such crops as sugar beet or potatoes can be grown, the frequent cultivation which they must receive during the growing period is a great advantage in cleaning the land of weeds, but we cannot grow any crops which require inter-tilling on a field scale, and so this advantage, too, is nullified. There are reasons, however, why rotational cropping is worthy of consideration. One is that it facilitates the control of certain diseases, notably take-all and flag smut. Wheat is our main revenue crop, and the rest of our farming practice must be adapted to the needs of the wheat crop. It is well-known that take-all and flag smut cannot be controlled, much less eliminated by pickling. They must be starved out of the soil. A clean fallow before the wheat crop is essential, but take-all cannot be starved out in one year. If the land is left out to pasture, barley-grass will almost certainly appear and serve as quite a good host for takeall spores. And so it is essential to introduce a crop of oats before the fallow, and if the oats are preceded by a crop of peas, they will benefit greatly from the accumulated nitrogen, and there will be no host for the disease for three consecutive years.

The other most important aspect of the question is the maintenance of soil fertility. I believe it is a common experience locally that the land is much tighter and harder to work than it was 15 or 20 years ago, and this is due almost entirely to the rapid exhaustion of supplies of organic matter in the soil. Apart from making ploughing a heavier and more costly job, this has a direct influence on the effectiveness of fallow. It is well known that during a period of fallow, nitrogen is added to the soil, but perhaps not quite so well-known that the tiny organisms which take the nitrogen from the air and convert it to a form available to the plants

actually live on the organic matter of the soil. They must eat if they are to live and work, and their food is humus-decaying organic matter.

By working the soil, we admit air from which the nitrogen is drawn, but if the amount of food available for the bacteria is steadily reduced, their numbers and their vigour must also be reduced, and there must be a corresponding reduction in the amount of nitrogen available for the crop. We must feed the bacteria so that they can feed the crop. The practice of alternating wheat and bare fallow is very exhausting for the supply of organic matter.

Another practice which is fairly common is the adoption of a three-course rotation, fallow, wheat, pasture. From the point of view of the wheat crop and the soil this is, of course, far better than the alternation of fallow and wheat, but it has its drawbacks. The most obvious is that it provides only one revenue crop in three years. This is a small point in light mallee land, and the practice might well be carried out there, but where land is £12 or £15 an acre it places a heavy burden on the wheat crop which must pay for the bulk of three years' rental of the land.

Moreover, we cannot expect a good growth of high quality forage on our land following a wheat crop. On a recent visit to Roseworthy Agricultural College we saw that there, in a good season at any rate, a really wonderful growth of fodder may be developed. Whether a heavier application of superphosphate would make a difference here is a matter requiring experimentation, but as a rule the returns from a paddock left out to pasture are rather meagre and so it is necessary to charge nearly three years' interest to the wheat crop. Moreover, the benefit to the soil resulting from the droppings of sheep and cattle can only be proportionate to the amount of feed grown. The maintenance of soil fertility is very largely dependent on keeping as many stock as possible.

The sowing of fodder crops is then necessary if we are to keep on farming our land successfully. At the present time there is no more profitable sideline than raising fat lambs and there is no better forage crop which we can grow here for them than field peas. Peas not only leave the soil richer in nitrogen, but, if grazed, supply a surprising amount of fodder, and besides raising first-class meat and wool, the land is greatly enriched in organic matter by the droppings of the sheep. The inclusion of peas in the rotation thus provides a record revenue crop immediately following the wheat, besides maintaining soil fertility. The chief drawback is a tendency to foul the land with wild oats. If wheat is to be grown after peas, cultivation is generally necessary to secure a clean crop. It is probably better to sow oats, which may be expected to yield heavily and may well be cut for hay or ensilage. If left for grain, they should provide a fair revenue crop or form excellent reserve of concentrated fodder. Barley might be grown instead of oats, but as it is subject to take-all and flag smut, oats are more beneficial.

In the fifth year the land may be left out for grazing, which one would expect to be fairly good following oats or barley, especially if dressings of super in previous years have been fairly liberal. An alternative would be to grow wheat after peas and follow the wheat with oats, which should be grazed, or again the oats might be cut or reaped and the land left out in the sixth year.

Stockraising must play a very important part in agriculture if the fertility of our soils is to be maintained and wheatgrowing is to be permanent. One thing is very plain. A man cannot adopt a five or six course rotation if he has only two or three paddocks. Subdivision of areas must go hand in hand with the development of a more complex rotation. Temporary fences are worthy of consideration at the present time when capital is scarce. It is all a question of economy, but a rotation on somewhat similar lines to those indicated will eventually prove most profitable in this district. Such a system would maintain the fertility of the soil at a fairly high level and should thus be permanently profitable.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Greenock	18/3/35	24	"First Aid," H. B. Scholz	A. Schubert
Stockport	12/4/35	11	Crop Competition Report	L. E. Klaffer
Penwortham ...	27/3/35	16	Address—W. C. Johnston	A. R. Jenner
Truro..........	15/4/35	16	Address—W. C. Johnston	L. S. Davis
Upper Wakefield	18/4/35	11	Address—W. C. Johnston	H. W. Gregor
Light's Pass ...	15/4/35	14	Address—H. B. Scholz...	C. A. Verrall
Wasleys	21/3/35	14	Address—W. C. Johnston	C. R. Currie
Wasleys	11/4/35	16	Conference Report—E. W. Day	C. R. Currie
Brownlow	17/4/35	19	Address—W. C. Johnston	A. R. Steinborner

YORKE PENINSULA DISTRICT.

ARTHURTON (Average annual rainfall, 16in. to 17in.).

February 7th.—Attendance: 14.

HARVEST REPORTS.—Mr. S. Henderson reported that his crop had been disappointing. His best fallow had not yielded as well as poorly prepared fallow. Of the wheats grown, Aussie proved best, with a yield of 10 bags to the acre. Barley also was below average. Mr. S. Brine said in the Port Clinton district crops did not finish well. Up to a certain stage they appeared fair for the season, but failed to maintain the earlier promise. Merriden wheat returned 20bush.; other varieties were lower. All wheats except Early Gluyas shed badly; Gluyas lodged badly. Barley averaged 17bush., and was A1 sample. Mr. R. W. Burns said Ford on land fallowed with the combine gave best results. Barley returned 7½ bags per acre, while other on good soil away from the coast returned 2 bags per acre less. Both samples were A grade. Mr. P. Roads reported fair crops, Dan variety being the best. Wheat and barley averaged about 7 bags per acre. Mr. C. Hicks considered the season ideal for barley in sandy soils; his best crop yielded 13 bags per acre. Wheat returned 6 to 7 bags. Ranee was the best variety. Mr. L. Clasohm reported fair crops, considering the dry spell during seeding time. He had to use a culti-packer to get the land fine enough for seeding. Sword was the best wheat. Mr. E. Clasohm said Sword and Ranee proved his best wheats. He considered it was a mistake to grow more than two or three varieties of wheat each year. Barley returned 7 bags per acre. Mr. Noble said Arthurton had sent in some of the finest samples of wheat seen in the wheat yards. One sample weighed 65lbs. per bushel. A bulk sample taken from the district averaged 62½lbs. per bushel. (Secretary, T. Howlett, Moonta.)

Harvesting operations, Messrs. T. Rodda & Sons, Yorke Peninsula.

FIRE FIGHTING.

[Paper read by Mr. R. BURNS of the Arthurton Branch of the February Meeting of the Boor's Plains Branch.]

A historic review of fire reveals the fact that primitive man regarded it as something evil, malevolently supernatural, something that would endanger his life or destroy his environment. But gradually man learned the art of kindling and using fire, and to-day fire plays an important part in life's affairs.

Fire under control is essential to man's comfort. In almost everything we do we depend on fire in some way or other. Fire is essential in the cooking of meals, the lighting of cities, streets, homes and motor cars, the warming of rooms, etc., and every internal combustion engine requires fire to enable it to function. We depend on fire to consume rubbish and all unnecessary straw, grass, and wood in our paddocks, etc. The debt civilisation owes to fire is incalculable, for without it modern civilisation would not have been possible. Wonderful as fire is when under control, it is invariably a menace and a source of tremendous danger when out of control. Fire is a good

servant but a bad master. In our own State extensive damage and ruin is wrought by fire. Nearly every year uncontrollable fires rage in the Mt. Lofty Ranges. These bush fires often destroy valuable farms and homes are burnt and completely destroyed, rendering the unfortunate homeless, and not infrequently, human lives are sacrificed.

If a fire breaks out in a wheat growing district at the beginning of harvest a farmer may lose all and receive nothing for his labours, consequently he may thus be ruined. So it is necessary for the sake of all to take every conceivable precaution and exercise every preventive measure to ensure safety at all times.

The causes of these ruinous fires are a subject for very serious thought. There are many different ways in which a fire may commence. One authority has affirmed that 95 per cent. of fires are due to human agency. Of this percentage 90 per cent. is attributable to ignorance and carelessness.

Some tractor operators are guilty of working their engines without effective spark arrestors. Most up-to-date tractors are easily fitted up in this direction, and if so equipped the risk of fire will be eliminated. Frequently outbreaks of fires are caused through smokers carelessly tossing out lighted cigarette and cigar butts into dry grass. In December last a tree was struck by lightning and the surrounding crops were in danger of being destroyed, but the efforts of the Fire Fighting Association proved successful in extinguishing the outbreak before serious damage was done.

Fires are often caused by the carelessness of people burning grass and rubbish too near haystacks and crops, etc. The most serious and offensive cause of fire is that which is done intentionally. Such cases as these should be followed up and the offenders severely punished. It is foolish for a man to say he will never have a fire on his property because he is always so careful with everything connected with fire. Fires sometimes originate from the most unexpected quarters.

The old saying that prevention is better than cure surely applies to this subject. Firebreaks are an imperative necessity. Before attempting to burn a paddock, a good clean break should be made. No hard and fast rule can be laid down concerning the width of breaks. These must be determined by local conditions. A 12ft. break is generally considered adequate in these districts, so long as care is taken in every other direction. Before using the mouldboard plough—which is the implement usually used for this class of work—the break should be thoroughly cleared of all inflammable material. When intending to burn a paddock, a man should notify adjoining farmers. Suitable weather should be selected for unfavourable weather conditions sometimes prove disastrous. Under ordinary circumstances 3 or 4 men should be on the spot at the time of lighting. Holiday makers and campers should only light a fire to boil the billy on a prepared spot, and should see that the fire is thoroughly extinguished before leaving that spot.

Many districts can boast of an organised fire prevention and fire fighting committee. Bush fire legislation, the most recent being the "Bush Fires Act, 1933," provides for the legal constitution of such bodies. Under this Act, Fire Control Officers up to 15 in number from residents of the area in which they may exercise their powers, with an additional 15 from adjacent areas under conditions defined, may be appointed. Only men of representative character capable of leadership should be selected, the utmost care on the appointment of such officers being essential. It will be found that volunteer fire fighters will work willingly under leaders in whom they have confidence.

A member of the fire committee should be appointed to receive notice of a fire outbreak. It is his duty to telephone all controllers within a reasonable distance of the outbreak, notify landholders and do everything possible to hurriedly organise parties of men to hasten to the point of danger. Co-ordination between Intelligence Officers, Telephone Exchanges and Broadcasting Stations is a factor which makes for success. Spades or shovels and rakes and plenty of water should be taken to the scene of the fire.

Shovelling sand on to the fire is a good method of extinguishing the flames. Once at the fire, the local Controller immediately takes charge. Knowing the lay of the country he would decide on a plan of action. If the outbreak be on a large scale, a

system of breaks may be decided upon. This plan must be worked so that no overlapping takes place. Visiting Controllers would be wise to follow the advice of the Local Controllers and all volunteers on arrival should immediately place themselves under the control and direction of Fire Controllers. If a fire breaks out where there is no firefighting organisation, once the alarm is given—so long as it is not a false one—people should rush to the scene with the necessary equipment with all possible speed and do all in their power to suppress it.

However, people are not generally lax in this direction, and it behoves all who have anything to do with fires at all to take every possible precaution to prevent disasters and thus save the public of the terrible and strenuous ordeal of firefighting.

[By Mr. T. H. HOWLETT, Arthurton Branch.]

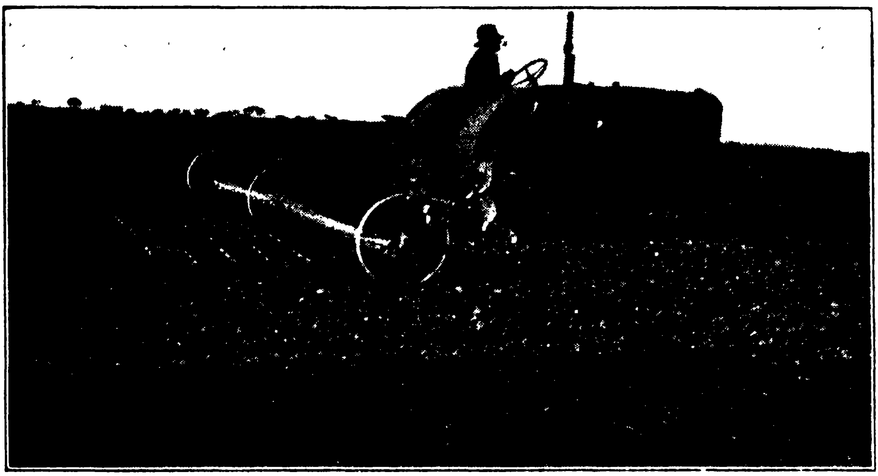
One might truly say that many of the most disastrous fires which exhausted the last ounce of strength and energy of fire-fighters, destroyed valuable properties, animals and bird life, and even human life originated from lack of knowledge concerning the danger of fire. It seems almost hopeless when men past middle age who possess more than average intelligence calmly light a pipe or cigarette, or throw cigar or cigarette butts still burning on to the roadside during summer. In his own home, such a person may be most careful and well alive to the danger of fire. Why then is one unable to impress on those old enough to use matches, the need for the same care at all times as that exercised in their own home? At a meeting of Fire Fighting Committee held recently, one speaker made a statement to the effect that the majority of the fires that got out of control in the Adelaide hills last year were caused by careless picnickers, who had neglected to put out the fire used by them before leaving the picnic grounds. Scoutmasters, Tourist Bureaux, the Postal Department and Automobile Societies are each endeavouring to keep the dangers of fire before the public, yet sterner measures appear to be necessary.

In farming districts, if each farmer made a practice of ploughing a fire break in winter about 8ft. wide around all grass paddocks and treated it as fallow during Spring it would minimise the danger of burning grass paddocks. A few hints on fire fighting:—The first thought should be what weapons do we intend to use against the fire. The leather fire beater (a piece of soft leather attached to a suitable handle) is used by many and appears efficient. Others prefer a wet sack or the top of a mallee bough. I prefer a shovel, provided loose soil is available. It enables one to stand some distance from the fire thus avoiding heat and smoke, and next to water earth seems the best for quenching fire. A substitute for the shovel should be provided in case hard ground is encountered. A pick or grubbing axe oft times proves helpful in providing loose earth for removing smouldering butts of grass and herbage. All such tools should have the owner's initials and some private mark stamped on them; this precaution often saves confusion later on. A water bag and harvest can of water should be carried if possible.

For the small cost of the articles mentioned every farmer could afford to keep a set for the purpose of fire fighting. The knapsack for fire fighting (which consists of a can holding four gallons of water strapped to the user's back and operated by a spray pump) is also very efficient and can be operated in close places, but a constant supply of water is needed. In organised districts, the usual practice is to have 40gall. drums or iron tanks with a semi-rotary pump and hose attached in readiness for outbreaks of fire. I favour the use of water when obtainable, for there is less danger of the fire gaining a fresh hold when extinguished with water.

In harvesting months when burning is prohibited, keep a careful lookout for accidental fires. Remember that quick action is necessary, as a few minutes may mean all the difference in damage a fire out of control will do. On arriving on the spot, endeavour to take in the full situation of the position and determine whether or not there is a chance to burn a break to check the fire front. If not, work from the rear and prevent if possible the side spread of the fire. Always have one or two men following the main workers to prevent minor outbreaks which quickly undo the work of the leaders.

Never put earth over smouldering heaps of manure, &c. In windy weather such embers will often smoulder for hours and may then be carried by the wind and restart the fire. It is far better if possible to scatter such matter about as it will then soon burn out. Much of the hard work of fire fighters is often undone by a change of wind, therefore, use judgment as to whether a change of wind is likely and try to be well protected on the side that could with a change of wind become a long fire front. In a case of fire out of control try and keep as cool as the fire and weather conditions will allow, a large fire out of control on a very hot day has a tendency to unnerve the stoutest heart. It is equally true that over excitement and eagerness have been the cause of many disastrous actions. It is often very noticeable in fire fighting the amount of effective work a quiet worker will accomplish while others who have become flurried have exhausted their strength and also have a tendency to do the wrong thing. Moreover, such workers often rush to a fire without a weapon of any kind and this is one of the reasons why all farmers should give some thought to fire fighting before the actual outbreak.



Seeding preparations, Yorke Peninsula.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Weavers	1/4/35	11	Paper	H. W. Cornish

WESTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kelly	2/4/35	25	Address—H. B. Barlow	F. R. Illman
Pinbong	9/2/35	10	Papers from *Journal*	H. C. Scholz
Pinbong	16/3/35	10		

EASTERN DISTRICT.
THE GORDO IN RAMCO.

[*Paper read by Mr. F. Lewis at the March meeting of the Ramco Branch.*]

As this district has the reputation of growing Lexias of a quality equal to anything in Australia it may be of interest to describe the methods practised by local growers to get this desirable result.

There are four contributing factors—suitable soil, age of vines, method of pruning, and drying. Practically all the Gordos in Ramco that are producing quality fruit are grown on a fairly steep, loose, sandy northern slope, originally big pine and mallee country with a natural drainage. They were planted in the early days of irrigation on the Murray and are about 30 years old. For some years they were pruned on the Gooseberry Bush system, which produced quality, but not quantity, and later, after becoming well established, were trellised by forming a rod on each side of the "crown" on a low trellis, Espalier style, and gradually cutting out the old spurs on each side of the row. This, of course, left a lot of large wounds which have never healed over and are now riddled with white ants, but this does not seem to affect the vigour of the vines.

When pruned, most of them appear to be black, distorted, ant-eaten old stumps, and anyone used to younger vines would naturally feel inclined to prune them below the ground level with an axe. One of the chief causes of inferior Lexias is the modern method of training the vine to a comparatively high trellis with long, thin arms which do not grow enough foliage to properly shade the fruit, with the result that the exposed berries are small and hard.

As a general rule, for Gordos, the nearer the butt the better the fruit. Provided the drainage is good enough, Gordos will stand any amount of water, and unlike Currants and Sultanas the more vigorous the vine, the better the fruit, both in quality and quantity. Unfortunately, Gordos ripen rather late and growers with other varieties leave them until their racks are cleared of Currants and Sultanas and they show a high Baume test.

When Gordos are just right for the distillery, they are too ripe to make good Lexias, as a fair proportion are already dark Raisins or else have turned a blue colour.

Gordos are practically all dipped in the old style boiling caustic; any other method tried so far is too slow in drying so late in the season. They should be dried in the

open to get as much sunlight as possible; in fact I have seen first class fruit dried on racks that had no provision whatever for covering from rain or dew.

Much of the sugaring trouble is caused through rack drying, especially if the grower has not sufficient plant and is compelled to shake down the fruit while the skin is still tight and finishing the drying on hessian. I have always dried as much as possible on trays, and for the past three years this tray-dried fruit has been kept separate and marketed in London as a distinct line. The colour is not very attractive, but buyers evidently appreciate the keeping qualities as they have sold readily. These were packed at the end of the run, and, of course, missed the early markets. Another cause of sugaring is close stemming. With the stemmer set close enough to take off all "tails" and the fruit is a little too dry, it knocks the skin about badly and when moistened up overseas it becomes sticky and sugary. If a fairly large parcel of Lexias with the tails left on was tried out on the London market, prices realised would justify the experiment.

I have had very little experience in manuring Gordos and in 28 years have applied fertiliser only twice; once with Bone Super and once with Complete Vine Manure, and in neither case did the returns show any improvement, but wherever Stable Manure was used there was a distinct improvement. About three years ago a lot of the vines "went back" so I gave them an application of Sulphate of Ammonia at the rate of 1cwt. to the acre and the same amount the following year. This brought the vines back to normal and I am now harvesting a record crop.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Jervois	28/3/35	16	Paper from *Journal*	F. P. Baily
Lameroo	8/4/35	16	Address—R. L. Griffiths .	A. G. Potter
Taplan	27/3/35	10	Question Box	P. R. Hodge

SOUTH AND HILLS DISTRICT.

ECHUNGA.

March 6th.—Attendance: 26.

POULTRY.—Paper read by Mr. T. Sando.

Systems of Poultry Keeping.—In the more commonly accepted classification there are 5 systems:—(1) Free range; (2) colony; (3) semi-intensive; (4) breeding pen; (5) intensive.

Comparative Value of the Systems.—The free range system is only suitable for those who have a considerable area of land at their disposal. For farmers and some small holders this system offers very great advantages. Many commercial egg farmers also rear their birds on this system. Whenever possible, growing stock should be given their entire liberty. The colony system is perhaps more suited to small holders than any other class of poultry keeper. The semi-intensive system is one to be recommended where there is sufficient room available for the erection of the necessary runs. For small holders, pedigree stock breeders, and the like this system is eminently suitable. The intensive system is only to be recommended for those whose space is very restricted. On reviewing these systems it would appear that the semi-intensive scheme would prove most suitable to local conditions. Under this scheme a scratching house and outside run would be provided. The area allowed is approximately 3 to 4 sq. ft. per bird in the scratching house, and about 20 sq. ft. per bird in the run. Therefore, a house 17ft. x 20ft. with a run attached, measuring 100ft. x 20ft., would be sufficient to accommodate 100 to 120 birds.

Breeds.—From experiments carried out by private individuals and Government departments extending over a period of many years, it has been proved that the breeds most suitable to our conditions are the White Leghorn and the Black Orpington.

Feeding.—There are two methods in common use—(1) wet mash and grain; and (2) dry mash and grain. Wet mash.—The usual practice is to give wet mash in the morning, green feed mid-day, and grain in the afternoon. A good mixture is equal parts by measure of bran, pollard and wheat meal, which constitutes 50 per cent. of the mixture and the other 50 per cent. consisting of chaffed green feed. A hot soup made from 2lb. of meat meal to every 100 birds is also added, and then thoroughly mixed, as much is fed as the birds will clean up in 25 to 30 minutes. Dry mash.—This is fed in hoppers, and although this method entails less work tests have shown that the egg production is not as high as when wet mash is used.

Cleanliness.—This is as important as feeding. All drinking and feeding utensils should be kept perfectly clean, and sleeping quarters should be kept free from accumulations of filth. Perches should be frequently scrubbed to keep down parasites. With proper housing (which means there must be no draughts or leaky roofs or damp floors), regular feeding, and attention to cleanliness, good results should be obtained, provided that a good type of the breed is used.

Marketing of Eggs.—To meet the requirements of the market careful attention should be paid to the manner in which eggs are despatched to the marketing centres. During summer eggs should be collected from the nests at least 3 times a day and immediately stored in a cool place until despatched to the packing floors. All eggs should be perfectly clean, and it will be found that if those that are stained and dirty are cleaned immediately they have been collected the cleaning can be carried out more effectively and much more quickly than if left for two or three days. The time has arrived when only eggs that are spotlessly clean, fresh, and of good quality will command prices that will return the poultry keepers a margin of profit, and that to market eggs in an indifferent condition will certainly mean failure. (Secretary, L. Walters.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Cherry Gardens..	23/3/35	20	"Pastures and their Improvement"	A. R. Stone
Blackheath	28/3/35	7	Paper from *Journal*	E. H. Paech
Yundi	27/3/35	—	Lantern Lecture—N. B. Tindale	T. R. Smart
Springton	3/4/35	9	"Calf Feeding," H. C. Bridgland	E. Brokate
Hope Forest ...	4/3/35	—	Discussion	E. C. Muldoon
Frayville	11/4/35	13	Address—R. Hill........	H. H. Ramm
Cherry Gardens	13/4/35	10	Homestead Meeting (Ricks Bros.)	A. R. Stone
Yundi	17/4/35	—	"Bee-keeping," C. Wollaston	T. R. Smart
Hartley	13/2/35	8	"Progress of Agriculture," C. Faehrman	John Brook
Shoal Bay......	16/4/35	5	Discussion	E. B. Bell

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31						

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

CONFERENCE AT MOUNT GAMBIER.

Delegates from Women's Branches in the South-East met in conference at Mount Gambier on 10th April. Mrs. Altschwager (Millicent) presided over an excellent attendance of delegates from the Coonawarra, Penola, Kalangadoo, Tantanoola, Rendelsham, Kongorong and Millicent Branches, the opening address being delivered by Mr. H. C. Pritchard (General Secretary of the Agricultural Bureau). The following papers were read and discussed:—

FIRST AID HINTS UNTIL THE DOCTOR ARRIVES.

[Miss K. Hutchesson, Millicent.]

A few reasons why you should learn First Aid and Home Nursing:—Because one then has the knowledge to relieve suffering and possibly save human life. Because knowledge will be gained of what to avoid, and thus prevent further injury and suffering. Because the knowledge rightly applied assists the doctor and lessens the period of suffering for the patient. Because everyone should acquire knowledge of a subject which has proved of inestimable value in all walks of life. Because the means of obtaining this knowledge is within reach of all.

The doctor cannot always come at once when needed. He may be attending another case and while waiting him, it may be advisable to administer First Aid.

A first aid outfit should consist of the following:—Dry cotton wool, sterilised gauze and bandages, boracic lint, adhesive tape, a pair of small scissors, a bottle

of tincture of iodine, ammonia for insect stings and inhaling in the case of fainting.

The following hints will be helpful but the doctor should always be called as quickly as possible, especially in the case of accidents.

Fainting.—Lay the patient on his back with the head turned on one side and if the face is pale lower the head and raise the feet. Undo all tight clothing Ensure an abundance of fresh air. Sprinkle the face with hot or cold water alternately. Apply warmth to the pit of the stomach and the heart. Do not give fluids or food while insensible.

Nose Bleeding.—Place the patient in a sitting position before an open window with the head thrown slightly back and the hands raised above the head. Loosen tight clothing. Apply a piece of ice or something cold over the nose and at the back of the neck. Place the feet in hot water and induce the patient to keep the mouth open to avoid breathing through the nose. Do not allow him to blow through the nose.

Haemorrhage (Bleeding).—Haemorrhage is of three kinds. *Arterial*: blood from an artery, which is bright red. The blood spurts out in jets. *Capillary*: the blood is red. It may flow briskly or merely ooze from all parts of the wound. *Venous*: the blood is dark red, flowing in a steady continuous stream. Place the patient in a suitable position, remembering that blood escapes with less force when the patient sits and still less when he lies down. Expose the wound removing whatever clothing may be necessary. Immediately apply pressure with the thumb or fingers directly on the bleeding spot. Maintain direct pressure between the heart and the wound by applying a firm pad on the pressure point. Encircle the limb by a narrow bandage or strap with its centre over the pad and tie the ends of a half knot on the opposite side. Insert a short strong stick and tie it firmly to the bandage. Twist the stick to tighten the bandage which will press the pad upon the artery and arrest the flow of blood. Tie the end of the stick to the limb so that it will not slip and release the pressure. Bleeding of the oozing type is controlled by pressure on the dressing and firm bandages.

Fractures.—When a bone is broken a fracture is said to have occurred. Give immediate attention, observing the following rules. First attend to fracture on the spot. Restrain bleeding when present. Cover the wound with a clean dressing. Always steady, and support the injured part. Try with great care and without using force to place the limb in a natural position. Use bandages, splints and slings when necessary and practicable. Remove a patient suffering with a fractured spine, thigh, or pelvis in a recumbent position. Every doubtful case treat as a fracture. Send for or take the patient to a doctor.

Splints must be firm, long and broad enough to keep the joints immediately above and below the fractured bone at rest and should if possible be padded to fit accurately to the limb. A splint may be improvised from a walking stick, umbrella, broom handle, flat piece of wood, cardboard or anything that is firm, long and wide enough to support the fractured bone. Bandages must be applied firmly over the splints, but not so tightly as to constrict the circulation of blood in the limb.

No case of head injury should be regarded lightly. Place the patient at rest in a quiet room on a low pillow and apply warmth. Apply ice or cold water to the head continuously. Do not give stimulants, and obtain medical assistance as soon as possible.

Sprains.—Are due to a sudden wrench or twist. Support the limb in the most comfortable position well raised. Apply cold dressings to the joint. If this does not give relief, apply towels wrung out in hot water. For a sprained ankle if out of doors apply a figure 8 bandage tightly over the boot. Keep the bandage wet after application, thereby tightening it. If the patient is indoors first remove the boot and stocking and treat as above.

Drowning.—Do not lose time. People have been saved even though they have ceased to breathe and are apparently dead. Apply artificial respiration. Send for a doctor at once. Carry out the following directions proceeding systematically and do not give up till the doctor pronounces the case hopeless. Remove weeds, sand, etc., from the mouth and keep the air passages free. Loosen clothing at neck, chest, waist, and see that breathing is possible. Lay the patient face downwards, turn head to one side, arms forward and palms down, perform artificial respira tion. Kneel astride the patient facing his head, place the hands flat over the lower part of the back, lean forward keeping the arms stiff and firm, press steadily and firmly. This action forces air and water from the lungs. Draw back the body and relax the pressure but do not remove the hands. This permits the chest to expand and draws air into the lungs. Repeat these movements regularly but not too frequently—16 times a minute is a good average. Time the movements with the aid of a watch. Do not be hurried or flurried in striving to restore the patient, but be persistent. When the patient commences to breath normally assist natural circulation of the blood by briskly rubbing the body and limbs towards the heart.

Electric Shock.—If the patient is still in contact with electric current *do not touch* him, unless you are insulated. Rubber gloves or a pad made of any rubber material will afford effective insulation. If these are not obtainable, push the patient away with a piece of dry wood. Lay the patient on his back, loosen all tight clothing, allow a sufficiency of air. If breathing has ceased or is feeble, apply artificial respiration as described under drowning.

HOUSEHOLD HINTS.

[Miss I. E. Fensom, Millicent.]

Testing Oven Heat.—To judge the heat of an oven, try it with a piece of white paper, leave it for about 3 minutes and if too hot the paper will blacken. When the paper becomes dark-brown the oven is fit for small pastry and scones. When light-brown it is ready for tarts and when dark-yellow it is right for bread, pound cakes or large meat pies. When just tinged it will be ready for sponge cakes or any other light cooking.

To Clean a Vacuum Flask.—Put some crushed egg shells in it with a little vinegar, shake well, then half fill with water and stand for a time. Shake again, then rinse thoroughly. Invert the flask in a jug, and when dry, put away—do not replace the cork, as this is liable to make the flask musty.

To Remove Tar.—Scrape off as much as possible, then rub on any clean mutton fat or lard and let remain for 24 hours; if linen or cotton, wash the article out in strong warm soapsuds; if woollen or silk, take out the grease with ether or methylated spirits.

To Remove Motor Grease or Tar.—Get a good brand of eucalyptus and rub the spots with a clean cloth dipped in eucalyptus, change the cloths as they get soiled. Hang out in the air when finished and then the smell will disappear. It is also good for cleaning collars of men's suits.

Uses for Sugar Bags.—To save the wear of tea towels, cut a piece of sugar bag the size of the tray and bind round with cretonne or bias binding. Place this on the tray before putting wet crockery on it. This will not get half so wet as they do without it. There are many useful things to make such as peg aprons, kettle holders, and aprons for gardening, scrubbing and all outdoor work. Very nice cushions for verandah or garden seats can also be made by dyeing the bags any colour you wish and either stencilling a design on it or cut out any figure from cretonne and button holing it on. They will also make sleep-out bed covers, seats for deck chairs, duster or string bags.

Uses of Borax.—Borax is an antiseptic. It is an arrester of decay, and as such is useful in the preservation of meat, butter, milk and all articles of animal food. It softens water for cooking, bathing, washing, and all household purposes. It is a good cleaner for all paint work. Put a tablespoon to a gallon of water, it will not leave any white marks. It whitens linens and cleanses them better than soda. It cleanses and heals ulcers, festering wounds and sore throats. When powdered borax is sprinkled about places infested with ants, the pests soon disappear. It can be used in cooking green vegetables in place of bicarb. soda, preserves the colour and makes them tender. Limp salad vegetables regain their crispness if soaked in water with a little borax added to it. When washing, add ½lb. borax to 10galls. water, soak white clothes in this, and soap will be saved. An ounce of borax dissolved in 1 pint of hot water and then allowed to cool, will kill aphis on roses and other plants.

Cleaning Fireplaces.—Fireplace bricks can be cleaned, even if very sooty and dirty, by brushing them first with a stiff broom and then applying a mixture made from ½ pint of strong household ammonia, ½lb. of powdered pumice and 1 quart of soft soap. Apply with a brush, leave for at least 1 hour before rubbing it well into the surface with a scrubbing brush, and rinsing it thoroughly with clear water.

Stains on Linen.—Most stains that are freshly made on table linen can be removed by placing a cloth over a dish and pouring boiling water on to the stain. Coffee, tea and various fruit stains yield to this treatment.

Grass Stain.—To remove grass stains from white flannel garments, rub on a mixture of equal parts of pure glycerine and yolk of egg. Allow to dry on, then wash the stains on the garment in the usual way after a few hours.

Scorched Marks on Linen.—If the scorch is not an absolute burn, it may be removed by boiling the fabric in milk, turpentine and soap. To ½gall. milk, use ½lb. soap and ½ a teacup of turpentine. Be careful about exposing the turpentine to the fire.

To Remove a Top from Salt or Pepper Shakers.—If the top of a cut-glass salt or pepper shaker becomes stuck place a collar of tightly wound wool around it and saturate the wool with olive oil. Stand it upside down in a warm place for a few hours then unscrew, anti-clockwise.

LITERATURE IN THE HOME.

[Mrs. W. Varcoe, Millicent.]

In many homes one finds rooms beautifully and comfortably furnished, and the meals served to members of the family are regular and nourishing, but to feed the mind no thought has been given.

Children's school books and a daily or weekly newspaper are all the reading that can be found in some homes, and in more than one the children are not allowed to read the newspapers. One thing to be thankful for is that these conditions are not so common to-day as they were thirty or forty years ago.

A carefully chosen library is a necessity in any home where there are children. It is as important for a child to have access to at least a few good books as it is that he be given the correct food to build up the growing strength of his body.

A young mind needs the right kind of literary food to help it develop in the right directions. A reader of the best kinds of literature is never ignorant and is usually more kindly in his actions toward others, and also to dumb creatures around him. He is usually more broadminded and tolerant in his views, as the more he reads the more he knows and also the more he knows, the more he realises what a lot there is which he does not know.

Good books are one of humanity's best friends; they are good and cheerful education and also pleasant, ever-ready companions with whom to while away one's

spare time. They are particularly good companions by the fireside on a wet day or winter evening.

BOOKS.

"Who would dare to limit or assess
Their influence in times of doubt and stress,
In deep perplexity, in sorrow's hour,
We turn to books, and find in them the power
To aid and bless, we of the lonely bush.

"Earning our bread by constant toil and rush,
The sport of fickle Nature's varying mood,
Battling with drought, with pestilence and flood—
Snatch a brief respite, greater minds to meet,
And find in books companions doubly sweet."

Country boys and girls have a wonderful opportunity to improve their minds and broaden their outlook by means of good books. They are not hemmed in by a round of pleasures as are city young people. Country people have to depend more upon themselves than upon others for their amusements, and there is no more profitable and restful entertainment than the reading of good books.

One can sit at home and travel the world by reading books written by those who have travelled in far countries. One can explore new countries and learn of the many strange customs and habits of the inhabitants of those countries, or read interesting books of history, fiction, or humour. Almost every book has in it something that will benefit the reader, some line that will broaden the mind or improve one's vocabulary. In starting a small library for the home, two of the first books necessary should be the Bible and a good standard dictionary. No library is complete without a good dictionary.

For the benefit of the children there should be a copy of "Lamb's Tales of Shakespeare," the "History of England," "History of Australia," Daniel Defoe's "Robinson Crusoe," and R. L. Stevenson's "Treasure Island," as well as others of his writings, "Pickwick Papers," by Charles Dickens, "Innocents Abroad," by Mark Twain, poetical works of John Masefield, and Bunyan's "Pilgrims Progress." Some of Ethel Turner's books and those of Mary Grant Bruce, as well as books by other popular writers of fiction for children should be chosen.

H. V. Morton's three books—"In Search of England, Ireland and Scotland" deserve a place in every library, also poems of Longfellow, Robert Burns, Tennyson, "Ben Hur," by Wallace, "Uncle Tom's Cabin," by Mrs. Beecher Stow, "Les Miserables," by Victor Hugo, "The Three Musketeers," by Dumas, Complete Edition of Kipling's Verse, John Galsworthy's "Forsythe Saga," "Eugene Aram" by Lord Lytton and as many of Shakespeare's and Charles Dickens' works as one can afford, also Mark Twain's, "Ultima Thule," by Henry Richardson and "Karanga," by Hibble are two good books, "Singing Gold," by Dorothy Cottrell and as many more good books of all kinds as one's financial means will permit. "Freckles" and "The Harvester" by Gene Stratton Porter are two most interesting books and another two favourite American writers are O. Henry and Jack London.

NEW GUINEA BUTTER BEAN PICKLE AND EASY WAYS TO COOK A RABBIT.

[Mrs. F. Todd, Rendelsham.]

The much despised rabbit is often a godsend to the farmer, and in country districts also to those who must eat white meat. The rabbit is best hung for a day in cooler weather; choose rabbits three parts grown. Wash, or better still, wipe with a cloth wrung out in warm water. The rabbit needs plenty of herbs, seasoning, bacon, pork, etc., to make it appetising.

Stuffed Rabbit.—A large cup of bread crumbs, ½ cup chopped suet, parsley, thyme and seasoning to taste. Bind with a beaten egg, fill the body of rabbit with stuffing and sew up with strong white cotton. Press hind legs towards head, and fore legs towards back, place slice of bacon on loin; skewer all and tie with string; baste well. Mashed potatoes, green peas, and brown gravy make an appetising dinner. Also 4 sausages can be placed inside of rabbit and one served to each person. Instead of an egg to bind stuffing, a piece of butter and a little milk can be added, and is not quite so dry.

Boiled or Steamed Rabbit.—Place rabbit in saucepan with a little water, dripping or butter, pepper and salt. Cook until tender, place on dish and pour over parsley or onion sauce. Mashed potatoes and cauliflower are nice with this dish.

Braised Rabbit.—Joint a rabbit, dry well on cloth, roll in flour, fry until brown in boiling fat, place in saucepan, fry onions in fat left from frying rabbit and add to rabbit in saucepan and stew gently.

Irish Stew.—Place alternate layers of rabbit, potatoes, onions, etc., in baking tin, season each layer and sprinkle with dried mint and flour. Small pieces of bacon, pork or ham can be added. Nearly cover with water, place another tin on top and cook in hot oven for 2 hours.

Rabbit Pie.—Cut rabbit into small pieces, and place in alternate layers, tomatoes, onions, carrots, etc., into pie dish. Add seasoning, place in oven and cook till tender, about ½ hour. Before dinner, place on short or flaky crust. Add a little water or thicken a little before placing pie crust on.

Cold in Sandwiches.—Men folk are fond of a rabbit's leg sprinkled with salt and placed between bread and butter for dinner in the paddock. Also a couple of rabbits are nice cooked or roasted with a piece of pork and apple sauce.

Rissoles.—Put rabbit through mincer with ham and mince, also a green apple, a few bread crumbs, and cold potato. Add 2 or 3 eggs. Make into rissoles and fry in hot fat.

NEW GUINEA BUTTER BEAN PICKLE.

The butter bean is like the marrow and cucumber in habit and growth. To use as a vegetable it must be cut young whilst the skin is still tender, also for pickling. When young, the skin can be used. Later the skin becomes hard and must be peeled. Scoop out the inside and cut into pieces, place in pan in layers with onions, cucumber, green tomatoes and apples. Sprinkle each layer with salt. Cover with water and stand all night. Next morning drain, place in pan, cover with vinegar, 2 or 3lbs. of sugar according to size of pan and quantity of vegetables, 2 tablespoons of ground allspice, and cook until tender. A nice pickle can be made if white vinegar is used with a little cornflour and mustard to thicken.

HINTS ON PERSONAL APPEARANCE.

[MRS. Z. A. BIGNELL, Rendelsham.]

The right care and culture of the human body is a duty incumbent on every woman. It may not be within the reach of all to enjoy the charm of perfect features, but it certainly is within the range of possibilities for almost everyone to take the necessary care of the hair, skin, etc., and thus ensure the possession of some of the many features of beauty. It is interesting to remember that there is a loveliness about all little children—their baby heads sunning over with curls, the delicate rosiness of their little fat cheecks, and the rounded curves of their chubby arms. No matter what the features, it is the age which makes the beauty, but in going among groups of adults, the impressions gathered are quite different, and one wonders why it should not be possible for a far more generous average of good looking people to be seen than is visible in cities. Surely with due thought and cultivation, there might be almost universal beauty of maturity as there is of youth.

The answer is not far to seek. In all too many instances the wear and tear, the rush and turmoil of life have blotted out all but the daily round of duties, and people have forgotten that they could with just a little care have retained much of the brightness of younger days, and attained the true beauty that belongs to every age as truly as it belongs to spring, summer, autumn and winter.

Moderation is the key note of the situation—too much care results in artificiality. Every one has had the experience of the girl who has overdone it, and who in her effort to look her best has lost the charm of natural girlishness, so each one must judge for herself the amount of care and the right means necessary to use in order to express in face and form all the beauty of which they are capable. To have a fresh clear skin and the delight of growing health, the daily bath is an absolute necessity.

The pores of the skin must be thoroughly cleansed, in order that the blood shall be able to do its duty to the frame through which it flows. The softer the water the better for the skin; a very refreshing bath is made by the addition of vinegar, which can be scented by soaking in a few drops of rosemary, camphor, sage, mint, or lavender.

Clean clothes should be worn as frequently as possible, fresh air is another aid to beauty, also exercise. Food and sleep play a most vital part in the beautifying and development of the appearance and in both these directions some people need more than others. 10 p.m. to 6 a.m. are the regular hours for sleep. It is impossible to begin too early to the care of the hair; a dirty brush should never be put near the hair. Brushes should be washed often and a good way to dry a brush is to hang it by a piece of tape before the open window. Ammonia added to the water cleans brushes thoroughly; the comb can be scrubbed with a nail brush.

Face Creams.—It is a great mistake to be careless about the buying of creams for the complexion—only the purest and best should be used. Olive oil rubbed lightly into the skin and then wiped with a clean piece of cloth is very good. Almond oil is an excellent grease to use on the skin under powder.

Chamois leather makes the best puff, and a little powder may be used carefully and evenly by this means. Only the best powder should be used. It is cheapest after all, for it lasts longer and imparts a finer and softer finish to the skin.

A final hint, never eat anything that disagrees with you—if it is desired to keep a good complexion. Indigestion is one of the greatest enemies of the skin, and for this reason the simpler the food, the better. Fruit, either fresh or cooked, and green vegetables should form a part of the daily diet.

A sallow complexion can be brightened by the application of cucumber milk. Mennaline makes eyelashes and eyebrows longer and can be applied to the lashes and brows at night. Cleminite can be used instead of powder and can be procured from a chemist by the ounce, and just enough water to dissolve it and applied to the face in the usual way. The effect of this preparation is retained all day under the most trying weather conditions.

Mr. A. L. Warren, R.D.A. (District Horticultural Instructor) delivered an address "The Home Garden."

FANCY WORK.

[Mrs. Stafford, Tantanoola]

How to Choose Material and Design.—Before commencing a piece of work it is well to consider the purpose and use to which the finished article is to be put Much good work may be spoilt and time wasted by working with unsuitable materials and inappropriate designs.

If the article to be worked is to be in constant use and likely to receive hard wear, the foundation material chosen should be of firm durable texture, and the working thread, a well-twisted silk or a reliable mercerized cotton, and, if it is

to be frequently laundered, fast colours should be specially selected. Conventional subjects are more easily treated than natural ones in most cases, as they can be worked in any colouring to match the general scheme of the room, of which the article is to form a part. If floral designs are preferred, however, be sure to work them in natural colouring, and in stitchery to represent as nearly as possible the actual form of each flower.

Broadly speaking, there are four points which should be borne in mind:—

(1) Choice of material.
(2) Appropriate design.
(3) The colour scheme.
(4) Suitable stitches.

Each of these points should be decided by its suitability to the purpose in hand. For example, fire-screens may receive different treatment from cushions; more expensive material and floss silk may be chosen for a screen, as there is practically no wear; the design should be chosen with the idea in mind that it will be seen in an upright position, the colouring should be bright, as the object of a fire-screen is to hide the barren look of an empty grate, and to provide an attractive object for the eye in lieu of a fire, which is always the centre of attraction in a room.

For cushions, the material should be of rather firmer texture as it has to stand hard wear; the working thread should be twisted, and stitches chosen which keep the working thread firm and taut so that it is not liable to fray. When selecting a design for a table cover or a cushion for general use, remember that the cover will be seen from all sides of the room, and should look equally well seen from any point of view. With regard to the cushion which is in constant use, a symmetrical design is best so that it can be turned about in any way and still look right.

For curtains, borders or sprigs may be chosen, but always remember that floral sprays should grow upwards.

Bedspread designs are often very varied, but they should give the idea of restfulness, either a dainty little spray repeated over the whole surface, the monotony relieved by varying the colours of alternate sprays, or the stitches in white work; or a large design of hops, poppies, etc., which are very suggestive of sleep.

If many colours are selected for the embroidery, the stitches chosen should be few, thus showing off the shades to the best advantage; while for all white work a variety of fancy stitches and fillings may be used, as the one colour enhances the beauty of the actual stitchery.

The Blending of Colours.—When embroidering in coloured work, the heaviest portion of the design should be worked in the darkest shade.

With the majority of flowers and leaves this tone is at the centre, ranging to the lightest on the outside. Always remember that a full blown flower is paler than the bud, and also has far less shadings.

Competitions always tend to increase efficiency in the standard of work, irrespective of what industry or hobby it might be.

Evenness is absolutely essential in needlework, as this improves the standard of the work and also increases the marks awarded to the competitor who follows this out.

Fineness is another strong point, as often in embroidery it is harder to work finely along a narrow design line than it is to overcast it coarsely along the same length.

ITEMS OF INTEREST FOR CHILDREN.

[Paper read by MISS P. FOALE at a recent meeting of the Parilla Branch.]

A child's mind is always working, therefore must be doing something, so if a child has nothing to play with and is at a loss to know what to do next, nine times out of ten he will get into mischief; this will worry mother and then he will have to be spanked for it, whereas if he had something to occupy his mind it would be better for both mother and child. But it is often a mother's problem to know how to cope with the wants of the young and active brain of a growing child. Bright coloured picture books are interesting to most children, but books of any size are rather expensive so the following is suggested:—Take a book with a nice firm cover. Leave every third page, taking care that those cut out are not cut too close to the centre, to prevent the corresponding page in the other half of the book becoming loose. The cutting of the pages out is to prevent the book becoming too bulky for the cover when finished, as the pictures will be pasted on both sides of the pages. This will bring the book back to the original size. Where the pictures do not cover the print, the little ones can fill in with water paints or crayons. Cover the book with wall paper or a pretty coloured material and it will be just as attractive as any that can be purchased. Any black and white pictures can be coloured with pencils.

Any small toy a child makes for himself, he values more than most other things in his play box. Get the children to do some modelling with odds and other things in his play box. Get the children to do some modelling with odds and ends such as cardboard, match boxes, dead matches, scraps of fine wire, transparent paper and animals cut from old books. This play, besides being clean, not only teaches the children to be resourceful, but will keep them inside on cold and wet days.

This illustration shows a model farm and homestead. This I made without spending a penny on it. The whole thing is laid out on a large piece of beaver board, it measured about 6ft. long and 4ft. wide. If only small pieces are available they can be joined at the back by pasting on sheets of paper, the joints do not matter so long as they are fairly close. The next thing is to draw with a hard stick and pencil the lines for fences, paddocks, stables, yards, drive, house grounds, etc. This done, take a punch or hammer and nail and punch holes at

equal distances apart for posts; also punch holes for trees in paddocks and garden and for horses and cows. One hole for each animal. Now make a little thick boiled starch and paint with a brush a small portion of the board and sprinkle with dark coloured sand. Let it stand for a few minutes then tip the board on end and all the surplus sand will drop off. Then do another portion the same and so on until all but the drive and garden paths are covered with sand. This gives it a natural appearance. If all the board is painted at once, the first part will be too dry for the sand to stick to by the time the last piece is finished painting. Paint the drive and garden paths and sprinkle with a very clean white sand to give it the appearance of being gravel. Put dead matches in all holes where posts are wanted and outline the drive with sprigs of fine green such as young tips of wild pine trees; also for a few trees in the paddocks. In the left hand corner, right to the front of the picture are small paper horses, two with riders, two with foals, and two or three others. These are pictures cut out of farm papers. Attach these to matches by means of a strip of stamp paper across the back, then stand the match in a hole between the trees. In the right hand corner at the far back, are cows cut out similar to the horses. If the drive is followed past the front and down the side of the house and then where it turns to go along the back of the house, the front of the garage will be noticed. This, and the shed further to the left, are cut out of thin cardboard. The house is made from a square box with a black pencil mark on the outside to make it look like bricks, then colour with red ink. The roof is cut like a bungalow and also coloured with red ink. Holes are cut for the windows, then paste some transparent paper over them from the outside, dip a finger in water and wet the transparent paper from the outside, and although it will go soft and stretch in a few minutes it will dry and pull tight then it will have the appearance of glass. Do not put it too near fire to dry quickly, or the heat will split the paper. Now hang little pieces of bright coloured material inside for curtains.

In the left hand corner of the garden can be seen a little round summer house. Make the bottom with cardboard and a roof of frayed binder-twine. This looks like a thatched roof. Also cut from thin cardboard the front gate and arch in one. The little white mark which appears to be right under the arch is a tiny white elephant standing in the centre of a pond made out of a small lid. This is half-way between the house and gate. The lawns and garden may be coloured with pencils. The windmill is made of wire and cardboard. One very small table, two chairs, and one garden seat which cannot be seen in the picture are on the front lawn. These are made of very fine white cardboard. With a red roof for the house and darker red for the garage and shed, the green trees and little animals, the whole plantation is sure to be pleasing to the children. Give the children an outline of the whole thing and then let them go ahead and build it as they would like it to be.

WIRRABARA (Average annual rainfall, 19.29in.).

January 17th.—Attendance: 21.

Mrs. G. Krantz exhibited specimens of bush carpentry, which included a work box, lunch basket, &c. She also demonstrated how to make containers in which to bake small cakes, using for this purpose the tops of jam and preserving tins.

HOUSEHOLD HINTS.—The following were supplied by Mrs. Krantz:—*Stoves, when Burnt Red.*—1oz. each of blacklead and bluestone. Cover with water and allow to stand for 24 hours or until dissolved. Pour into a large-mouthed bottle or earthenware jar. Paint on the stove whilst the latter is hot. Two coats may sometimes be required, and if too thick more water can be added. *Stove Polish.*—2ozs. blacklead, 1 cup each methylated spirits and furniture polish. Put in a Mason jar and screw down with a rubber ring to prevent evaporation. Put on a cold stove with a swab, allow it to dry, and

polish with a soft cloth. A handy swab can be made with a piece of sheepskin bound on to the end of a stick, the wool on the skin being clipped to the desired length. *To Use Up Stale Cake.*—Crumble the cake (or steam pudding), and add sultanas or any other fruit. Mix with eggs, according to quantity of crumbs, to a soft consistency. Jam may be added. Make some short pastry, roll thinly, and place on an oven slide. Spread on cake mixture, and place the remaining pastry on top. Roll lightly with a rolling pin to make firm, and place slide in the bottom of the oven. *Kitchen Cleanser.*—1 large packet extract of soap, 1 block of sandsoap, 2 tablespoons borax, 2 cups finely sifted ashes, 1 cup whiting, 4 cups boiling water. Slice the sandsoap and roll with a rolling pin. Add dry ingredients, and mix well. Finally add the boiling water and stir at intervals until it forms an even thickness. Stand for 1 hour, then place in a tin, or preferably a large-mouthed bottle or jar. *To Clean Aluminium Saucepans when Burnt.*—Pour a little water in the saucepan and put in an onion, boil for a little while, and the burn will rise off. *To Clean a Discoloured Aluminium Saucepan.*—Put in lemon skins, and fill the saucepan to the top. Rhubarb peelings and leaves will act in a like manner. *To Roll a Shoulder of Ham.*—When cooking the ham tie a string in a similar manner to that when tying a parcel, so that the ham can be lifted out when cooked. When cooking the shoulder to roll it must be boiled until very tender and the flesh commences to leave the bone. Lift out and skin in the usual way. Then cut out the bones, place a strong piece of calico on the side dish. Lie the ham near one side of the cloth, and place on it all loose pieces of meat from where the bone has been removed. Roll all as tightly as possible, the same as for a roly-poly pudding. Twist up the end of the roll, and tie tightly by twisting the cloth and cord similar to a roll of bacon. Leave until quite cold before undoing. *To Salt Meat.*—To half a kerosene tin of water add 2lbs. of salt, 1 cup of vinegar, and 1 dessertspoon of saltpetre. Boil until all is dissolved. Put in meat and boil for 5 to 10 minutes. Leave in brine until required, preferably in an earthenware or wooden vessel. (Secretary, Mrs. A. Curtis.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Belalie	9/4/35	45	Annual Social Afternoon	Mrs. E. L. Orchard
Snowtown	4/4/35	19	Address—Dr. A. H. White	Mrs. A. Hocking
Wasleys	4/4/35	45	Flower Show	Miss J. Braun
Hope Forest	4/4/35	20	"Country Women's Lives in West. Aus.", Mrs. Caw	Mrs. L. Fincher
Snowtown	21/3/35	30	"Fruit Bottling," J. B. Harris	Mrs. A. Hocking
Balumbah	4/4/35	11	Discussion—"Housekeeping"	Miss H. D. Jericho
Penola	3/4/35	28	Question Box	Mrs. F. J. Kidman
Sheoak Log	4/4/35	27	"Working of Women's Branches," Mrs. Hammat	Miss K. M. Koch
Wirrabara	21/3/35	13	"Preparing for a Sea Voyage," Mrs. A. Kranz	Mrs. A. Curtis
Gladstone	9/4/35	40	"Cold Meat Cookery," Miss Gardener	Mrs. L. J. Sargent
Mangalo	10/4/35	15	Dressmaking Demonstration—Mrs. Cleave	Mrs. B. M. Coles
Warramboo	16/4/35	10	"Home Reading," Mrs. Oswald	Mrs. A. M. Steer
Parrakie	18/4/35	18	Social Afternoon	Miss J. Halliday
Tantanoola	6/3/35	9	"Fancywork," Mrs. Stafford	Mrs. E. Telfer

// THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXVIII. JUNE 15, 1935. No. 11.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

Upper North, at Booleroo Centre, Wednesday, July 17th (Wepowie Branch, E. C. Roocke, Secretary, Booleroo Centre).

Hills, at Lenswood, Thursday, August 22nd (B. F. Lawrance, Secretary).

Murray Lands (East), at Alawoona, Thursday, October 3rd (A. J. Pengilly, Secretary).

Fruit (Non-irrigated), at Lyndoch, Tuesday, November 5th (J. S. Hammat, Secretary, Williamstown).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Pruning Competitions.

McLaren Flat, June 22nd; River Murray—Berri, June 25th; Barmera, June 26th; Moorook, June 27th; Cadell, July 2nd; Waikerie, July 3rd; Moorook (Championship), July 4th; Light's Pass, June 24th; Lyndoch, June 26th; Lone Pine, June 28th; Koonunga, July 1st; Greenock, July 3rd; Williamstown, July 5th; Watervale, July 8th; Williamstown (Championship), July 17th.

Toxaemia of Pregnancy.—Death of Breeding Ewes.

The Secretary of the Lipson Branch of the Agricultural Bureau reports the death of 35 breeding ewes. The ewes died very suddenly and apart from the fact that they were lying down and a slight discharge from the mouth was visible, they otherwise appeared to be in good health. This question was referred to Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S. (Deputy Chief Inspector of Stock) who says the name of the disease is Toxaemia of Pregnancy, and as the name implies, it is thought to be due to the absorptions of toxins (poisons) from the liver or bowels, but the specific cause is not known. The symptoms of illness appear about the last month of pregnancy. The affected sheep are always fat and generally running on good pasture or being given supplementary rations, and they are very often carrying twin lambs. Briefly, the salient features of the disease are:—

1. Ewes are in an advanced stage of pregnancy.
2. Nearly all are carrying twin lambs.
3. Are in high condition.
4. Running on good feed or being given supplementary feed.
5. Livers of affected sheep are pale, enlarged and fatty.

Symptoms.—Generally the owner's attention is drawn by the fact that affected sheep are apart from the flock. The affected ewe appears listless and if forced to move, walks aimlessly and with a staggering gait. The sight is often impaired and there is a grinding of the teeth. There is no appetite and the animal appears stupid. A twitching of the muscles about the head is often noticeable. As the disease progresses, some partial collapse occurs and when raised, the sick ewe may stand for a while, but will eventually fall and be unable to rise or use the legs even if supported. Death may occur in a few hours or even take several days, but it always occurs unless the ewe happens to lamb, when recovery will take place.

Treatment.—There is no effective treatment which will cure the disease, but 2ozs. of Epsom Salts dissolved in ½ pint of water to which half a cup of treacle is added, may be administered and, if possible, the sick sheep made to exercise. Recovery, however, is very rare.

The disease, however, can be prevented by seeing that the pregnant ewes are kept in good store condition and not allowed to become fat. If ewes are fat, place them on paddocks where the feed is not too abundant and where, in order to get sufficient, they have to exercise. Do not feed concentrates until the ewes have lambed. Where pasture is abundant, it will be necessary to exercise the sheep for a mile or two daily until they lamb.

It is emphasised again that high condition is the predisposing cause of the disease.

Is Inhaling Copper Carbonate Injurious?

Statements have recently been made to the Director of Agriculture (Professor A. J. Perkins) that farmers have been seriously injured by the inhalation of copper carbonate used in the dry pickling process as a precaution against bunt in wheat. The matter was referred to the Chairman of the Central Board of Health (Dr. A. R. Southwood) for an opinion, and he states that the effects on the human subject following the entry of copper or its salts into the body may be summarised briefly. If large doses are taken by the mouth, vomiting generally occurs promptly; harm may arise from the caustic action of the substances on the gastro-intestinal lining. Apart from such acute cases of copper poisoning, there is little evidence of injury to health. Men constantly engaged in the mining and smelting of copper, or in brass-founding and other industries where copper is used, are not appreciably affected in health thereby, and do not appear to suffer from symptoms indicative of chronic copper poisoning.

It is unlikely that the occasional handling of copper carbonate in the dry pickling process of wheat will cause harm to the health of persons engaged in the work. The inhalation of large amounts of the carbonate dust might irritate the throat, and perhaps cause attacks of bronchitis, but no serious danger is likely. Ample protection to workers would be secured by observing the following points:—

1. The process should be conducted in the open air or in well-ventilated sheds.
2. Workers should as far as possible stand to windward of the apparatus being used.
3. A simple mask or respirator might be used if any irritation was found to occur. Protecting the mouth and nose with a simple mask of a few layers of gauze would suffice.

Wheat Crop Competitions.—Offer of Prizes by Millers.

The Millers Produce Company of South Australia, Limited., has informed the Minister of Agriculture (Hon. A. P. Blesing, M.L.C.) that for this year the Millers would make a donation of £5 to each of the districts conducting a crop competition under the direction of the Department of Agriculture, subject to the Minister's approval of the Millers linking a prize with the Government grant for the competitions and also subject to a small modification of the competition conditions. This modification is that the five following varieties of wheat be not eligible for the prizes represented by the Millers' donation, viz:—Gallipoli, Free Gallipoli, Ghurka, Waratah and Nabawa. The reason for the exclusion of these varieties is that in the opinion of Millers they are "weak" wheats and not of the quality which will enhance the standard of Australian wheats. In judging for the Millers' prize, the existing conditions upon which competitions are judged will be followed and if, under those conditions, the winning crop should happen to be either Gallipoli, Free Gallipoli, Ghurka, Waratah or Nabawa, the nearest crop (not including one of the ineligible varieties) to the winning crop will be adjudged the winner of the prize. Each District Committee will decide if the amount of the donation will be used for "First," or divided into "First" and "Second" prizes.

When accepting this offer the Minister intimated that it will be clearly set out that the prize money will be subject to the conditions laid down by the Millers and that the prizes will be donated only to districts conducting wheat crop competitions controlled by the Department of Agriculture for the Championship Shield of the Royal Agricultural and Horticultural Society.

Entry forms for the competitions are obtainable from the Secretaries of the respective districts throughout the State.

Quality in Wheat.

The Argentine correspondent of the Empire Marketing Board (Mr. W. J. Jackman) recently reported that the National Wheat Board has determined the varieties of wheat most suitable for the six zones into which the cereal region of the Republic has been divided for the purpose. Pending the passage of the Grain Bill now before Congress, there was no power to enforce the Board's recommendations, but the Board's action was looked upon as valuable preparatory work, looking to the future. In classifying the various wheats, the Board kept in mind, first the industrial qualities and, second, the vegetative characteristics, as, for instance, winter and spring wheats. On the basis of quality three groups have been established—strong wheats, fillers, and soft wheats—the first two for the European market and the last purely for the domestic and Brazilian markets. Most of the leading railway companies, which maintain experimental farms, have lent their assistance to the Commission, as have also private experimentalists, and much valuable educational work should result. As illustrating the interest taken by the railway companies in the improvement of seed grain, one of them (the Central Argentine) has sent out for the eighth year its large cleaning machines, which are placed at the disposal of farmers for the cleaning and selection of their seed grain, free of charge, at the local stations.

Reports received from England with regard to the quality of shipments of wheat already received there were very satisfactory. Although the weight of the grain was low, the gluten strength was comparatively high, according to tests made by the British millers. A high percentage of this year's shipments were from the south of Buenos Aires and the Pampa, whose wheats for the last three or four years have been leading the Republic in regard to strength, and it was not to be expected that the standard would be maintained throughout the year.

Almond Growing at Black Springs.

Replying to a correspondent who asked whether the Black Springs district was suitable for almond growing, Mr. J. B. Harris, the District Horticultural Instructor, states that as the average annual rainfall is approximately 19in., and as the almond, generally speaking, thrives well in the middle north areas of South Australia, it should be possible to grow almonds satisfactorily at Black Springs. Occasional irrigation during the growing season would be advantageous in most years, and particularly in dry seasons. Almonds will not thrive where the soil is subject to waterlogging. Protection from frosts and cold winds during blooming time are very important. At least two varieties blooming at approximately the same time should be grown to permit of cross-pollination. The varieties recommended are IXL, Brandis, Hatch's Nonpariel, Ne Plus Ultra, and Peerless.

Woolly Aphis Parasite.

Replying to the Secretary of the Beetaloo Valley Branch of the Agricultural Bureau who asked for particulars concerning the introduction of the parasite (*Aphelinus mali*), the Deputy Chief Horticultural Instructor, Mr. A. G. Strickland, says the insect is best introduced in late winter or early spring. The Department of Agriculture will provide twigs bearing parasitised aphis at the cost of 6d., which includes postage, to *bona fide* growers who make formal application.

Subterranean Clover for the Waitpinga District.

"Is any advantage to be gained by sowing grasses with Subterranean Clover in the Waitpinga district?" This question—asked by a subscriber to the *Journal of Agriculture*—was referred to Mr. R. Hill, District Agricultural Instructor, who says that on freshly cleared land the only grass considered advisable to sow with Subterranean Clover is Yorkshire Fog. Sown at the rate of 2lb. per acre, it has given very satisfactory results. Other grasses should not be sown until the clover has been grown for about four years, when the soil fertility will be much improved. Grasses suitable to grow following that clover period are *Perennial Rye Grass* on the heavier soils and

Wimmera Rye Grass on the light soils, at the rate of 6lb. per acre. The seeding of pastures should be completed in the Waitpinga district not later than early in May to obtain the best results. The use of 1 and 1 superphosphate is not recommended where clover is to be encouraged, because of the detrimental effect that nitrogenous fertilizers in any great quantity have on leguminous plants. However, the use of a very light application of nitrogenous fertilizer with Subterranean Clover on freshly cleared land to provide nitrogen for the plant until it can establish its root system and harbour bacteria is at present being investigated by the Waite Research Institute, but until more definite results are obtained the process cannot be generally recommended. Superphosphate at the rate of 2cwt. per acre is recommended.

Wild Lavender.

The plant known as Wild Lavender (*Lavandula stoechas*) has been gazetted as a noxious weed within the boundaries of the District Council of Port Elliot. Wild Lavender is a garden escape, and appears to be spreading over a large area, and while it is not found on cultivated ground, it is quite thick on pasture land in some parts of the district. It is not difficult to destroy by tillage or hoeing, although attention for about three seasons would be necessary for its eradication.

Construction of Cement Concrete Walls.

In reply to several questions from a subscriber to the *Journal of Agriculture,* Mr. T. A. Macadam, Lecturer in Building Construction at the School of Mines says a fair width for a concrete wall of a building 10ft. high, when the wall is reinforced with steel roads ⅜in. laid 18in. apart horizontally and 3ft. apart vertically would be 6in. for the domestic type of building. If the wall is of considerable length without any re-entering walls assisting to support it, the thickness would be increased. To hold the building boards in position some form of timber support is necessary, and this is best provided by vertical posts at sufficient intervals to keep the boards in position, the posts being supported by struts secured to pegs driven into the ground. The feet of the posts could be bolted to the foundation or to another peg in the ground. The distance apart of the posts will depend on the size of the boards which are used, but care should be taken to see that the boards have sufficient support to prevent "bellying" when the concrete is being rammed in. When the lower portion of the wall has been built the vertical posts can be raised, bolted to the portion of the wall that is built, and the next section of wall proceeded with. This will avoid the necessity for providing sufficient timber to board up the wall the complete height. The boards could be held in position at intervals by light bolts, the bolts being threaded at one end and with nut and washer for tightening. Another method is to place a strip of galvanized iron across the top, or nail pieces of wood across. The bolts would be removed immediately the concrete had taken its initial set.

For internal walls the following concrete mixture:—

1 part cement,
3 parts sand (mixture of fine and coarse),
3 parts limestone gravel

is safe, but is not considered a good mixture on account of the large percentage of sand.

As to whether the outside of a cement concrete wall should be plastered or cement washed, this is purely a matter of choice, and depends on the type of building and the finish desired. Roughcast is a common finish for the outside of concrete walls, but would be more expensive, of course, than the cement wash.

Sooty Mould on Citrus Trees.

Replying to the Secretary of the Beetaloo Valley Branch of the Agricultural Bureau, who asked for the cause of and remedy of Sooty Mould, the Deputy Chief Horticultural Instructor (Mr. A G. Strickland) says Sooty Mould is directly connected with various scale insects, including the common black and brown scales. Various scale insects, aphides, &c., secrete a sugary honeydew, and it is on this honeydew that the well-known Sooty Mould grows.

Sooty Mould does not attack the tissues of fruit or leaf in any way, but merely grows on the surface. Nevertheless, when Sooty Mould is abundant, it is a sign of fairly heavy scale infestation, and quite apart from the question of scale, the presence of the mould interferes with the normal functioning of the tree. Furthermore, fruit is often so disfigured as to necessitate cleaning.

Control of Sooty Mould is entirely dependent upon control of the insects which make its growth possible. Elimination of the scale will get rid of honeydew secretions, and the Sooty Mould will disappear. Black or brown scales may be controlled by fumigation or white oil sprays applied in summer.

Value of Farmyard Manure.—Bonedust v. 45 per cent. Super.

The following questions: 1. "What is the value of farmyard manure?" and 2. "How do the manurial qualities of bonedust compare with 45 per cent. super?" received from the Jervois Branch of the Agricultural Bureau, were referred to Mr. R. C. Scott (Supervisor Experimental Work), who says:—

1. Farmyard manure will vary widely in its composition according to the class of animal, the nature of the bedding used, amount of decomposition, &c., but on the average, good material will contain 0.5 per cent. nitrogen, 0.26 per cent. phosphoric acid, and 0.63 per cent. potash. In other words, 1 ton of rotted mixed farmyard manure will contain 11lbs. of nitrogen, equivalent to 55lbs. sulphate of ammonia; 6lbs. phosphoric acid, equivalent to 28lbs. 45 per cent. superphosphate; 14lbs. potash, equivalent to 29lbs. sulphate of potash. However, these ingredients do not rapidly become available for use of plants, and particularly is this the case with the phosphates, with the result that even when heavy dressings are utilised it is necessary to apply the usual quantity of phosphatic fertiliser. In addition to the fertilising value of farmyard manure, this material also has appreciable influence as a soil amendment, warming cold soils, improving the water-holding capacity of light land, and encouraging the action of soil bacteria.

2. The usual analysis of bonedust shows 3½ per cent. nitrogen and 40 per cent. acid soluble phosphate, whilst 45 per cent. superphosphate contains 45 per cent. water soluble phosphate. The nitrogen is readily made available; in fact, is equal to that in sulphate of ammonia, whilst the phosphoric acid is slightly slower than that contained in a water soluble phosphate. Therefore, in comparing the two fertilisers, it may be said that superphosphate does not contain nitrogen, but on the other hand the phosphoric acid is more readily available for the use of plants.

Publications Received.

"Tree Fruits," Bulletin No. 2. Price 1s. 6d. net.

"Mushroom Growing," Bulletin No. 34, Ministry of Agriculture, England. Price 1s. 3d. net.

"Diseases of Barley," Bulletin No. 170. Price 6d. Department of Agriculture, New South Wales.

POULTRY INQUIRIES.

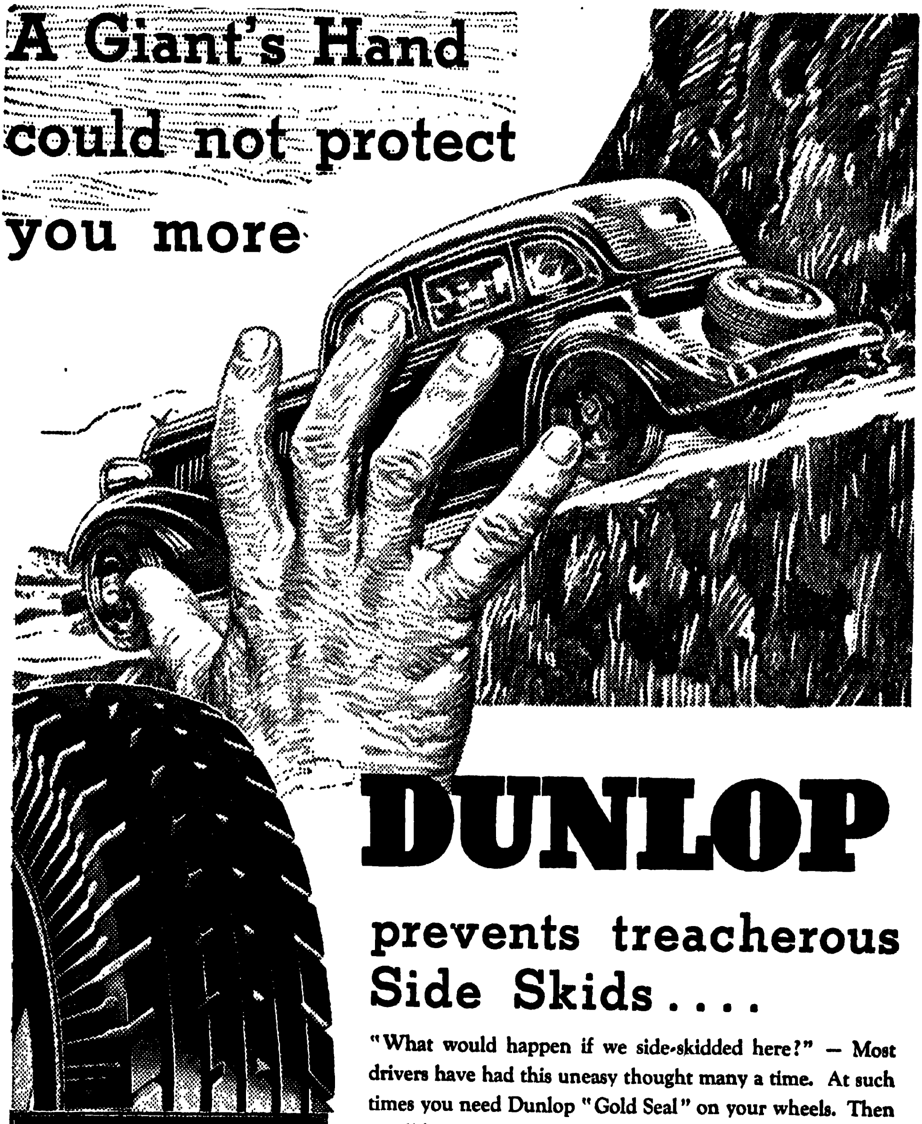
[Replies supplied by Mr. C. F. ANDERSON, Government Poultry Expert.]

Paralysis in Pullets.

Jervois Agricultural Bureau: What is the best treatment for pullets affected with paralysis?

Generally speaking, with pullets it is only occasionally that any number of them develop this trouble, but during the last two or three years there have been two cases where the trouble has been serious.

The experience of the Department is that this complaint may be due to two or three causes, the principal ones being the continued breeding from immature stock; that is, either from pullets which are only in their first laying season or from cockerels which have not fully developed before being used as breeders. It is strongly advised that


A Giant's Hand
could not protect
you more

no females be bred from until they have completed one full season's laying. The cockerels should be also fully developed before being used as breeders, and in the early part of the breeding season it is advisable to use second-year male birds.

The breeding stock should always have runs attached to the pens to provide sufficient exercise for the production of eggs suitable for breeding. The Department, however, has traced the principal cause to that of errors in the rearing of the birds. Quite a number of producers keep their chickens too much in confinement during the rearing season. It is essential that when the chickens leave the hot brooders—that is, from three to four weeks of age—they should be placed in portable cold brooders and have range during the growing period, frequently moving them on to fresh ground to provide the necessary exercise and not retard the growth of the chickens.

Another probable cause is that the young stock do not perch early enough. When chickens are from eight to ten weeks of age frames of wire netting 1in. in gauge, and kept from 12ins. to 15ins. above the ground, should be provided so that the pullets are kept off the damp ground during the night.

For the first two or three nights the pullets can be placed on these wire netting frames, after which they will readily take to them.

Feather-eating Poultry.

Taplan Women's Agricultural Bureau: Why do fowls pull feathers from others and eat them?

Reply—Some of the causes are over-crowding of the birds, too long a time between feeding, and frequently one bird may start the trouble, and unless it is taken out of the pen quickly, the trouble gradually spreads throughout the flock. Allow the birds to have a certain amount of range during the daytime, and feed the birds at least three times a day. They can have mash in the morning, wheat at mid-day, and wheat at night. If there are only a few affected, a little Stockholm tar applied where the feathers had been picked will frequently stop the trouble.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

Hon. Secretary Weavers Agricultural Bureau asks: "Does the frog of the horse's hoof come out periodically or no."

Reply—The "frog" or "hoof pad" grows from a vascular membrane which covers the so-called "sensitive frog." As it grows it is cast off when it grows to a certain thickness, while the part next to the ground is worn away by friction. In consequence owing to the frog's rubber-like nature, rags of horn along the edges are a common and natural process.

"Thrington" reports pony stiffness in hind quarters and over-heated fetlocks after getting at a bag of wheat.

Reply—The following treatment is suggested:—(1) Give following drench: Raw linseed oil, 1 pint; oil of turpentine, 4 tablespoons. Shake thoroughly and drench carefully. (2) Subsequently give 1 teaspoon of powdered nux vomica night and morning for 14 days. To give, mix the treacle and smear well back on the tongue. (3) Feed on good quality chaff (cut on green side so that not too much grain in it). Do not overfeed.

"Butler Tanks" has horse whose mane is thickly coated with scurf.

Reply—The trouble appears to be a form of mange. Treatment with sump oil and kerosene should be beneficial, though first of all the hair should be clipped from affected areas, and the scabby, scurfy patches well scrubbed with soap and warm water in which has been dissolved some washing soda, in order to remove the scabs, &c., so that the dressing used can be applied right on to the skin. (If it is only applied on top of a

collection of scurf, scab, &c., it is largely a waste of time.) See that every part of the body that is affected is treated and no patches missed, otherwise it is only a matter of time after treatment is discontinued before the condition of the animal becomes as bad as ever again. It should be necessary to dress the parts only once every two or three days and four or five applications should suffice. At the same time as giving local treatment to the skin, give the animal a tonic course of Fowler's solution of arsenic, giving 1 tablespoon in damped feed night and morning for a fortnight.

"Wisanger" reports 15-year-old mare in constant work, staggering gait, ravenous appetite, but would not drink. Died within three days.

Reply—The description of the case very strongly suggests the trouble to have been botulism, or so-called forage poisoning. Treatment is not very hopeful in these cases, but should be on the following lines:—(1) If animal still able to stand, put into "slings." (2) Give at outset a drench of 1 teaspoonful of potass. permanganate (Condy's crystals), dissolved in 1 quart of water, and follow shortly after with a drench of 1lb. Epsom salts, or raw linseed oil 1½ pints, turpentine 4 tablespoons. (3) Give 1 teaspoon doses of powdered nux vomica on back of tongue every 4 hours. (4) Feed on bran mashes and green feed.

Blackheath Agricultural Bureau reports colt rising two years with an over-shot bottom jaw.

Reply—The backward condition of the colt is due to his not being able to bite off the food properly when grazing owing to failure of the incisor teeth to meet. Provided that the animal is hand-fed, there is no reason why he should not become a profitable worker.

INCREASING THE STOCK CARRYING CAPACITY OF MALLEE FARMS.

[By R. L. Griffiths, D.D.A., Agricultural Instructor.]

(*Continued from page* 1218.)

THE IMPROVEMENT OF NATURAL PASTURES BY THE USE OF PHOSPHATIC FERTILISERS.

It will be noted that most of the species forming the natural grazing of the Mallee are far from ideal pasture plants, and that together they do not make a very good mixture. Consisting of grasses and various cultivation weeds, there is great likelihood of a protein deficiency. Also, in some of the newer country, particularly white sandy land, there is certainly a deficiency of phosphates.

The good pasture is almost invariably a mixture of grasses and leguminous plants, with some perennial species forming the basis of the mixture where possible. There are no perennial species in these natural pastures, nor are there any legumes. Even after adequate dressings of superphosphate, no perennial species appear naturally, and in the low rainfall areas—those below 12in. average annual rainfall—it has not been found possible so far to induce leguminous plants to grow. Here the effect of superphosphate is simply to encourage a more plentiful and probably also more nutritious growth of the existing herbage, thus increasing carrying capacity to some extent.

Within the areas of somewhat better rainfall—12in. to 15in. per annum—leguminous plants will grow, but do not thrive unless there is a very considerable reserve of phosphate in the soil. It is only after the continued application of super, either to cereal crops or as a top-dressing, that clovers begin to thrive.

With still higher rainfall—over 15in.—there is much less difficulty. It appears quite definitely that the higher the rainfall the less phosphate is required to encourage leguminous growth. It is certain, however, that without the building up of phosphatic reserves in the soil the naturalised clover species will not form any appreciable percentage of the plants for grazing.

In the low rainfall areas the addition of extra super to the last crop prior to a pasture period is justified, simply to improve the existing species, while in the better rainfall parts continued high dressings of 1cwt. per acre or more with each cereal crop—to encourage clover growth in the pastures—is essential if farms are to reach high stock-carrying capacity. In addition, when land is to remain pasture for any extended period, it should be top-dressed at least every second year with superphosphate, using 1cwt. per acre if possible.

There appears to be no necessity to sow seed of these leguminous plants. It is not known exactly where the seed comes from, but it is certain that on lands in the Murray Mallee with 12in. or more average annual rainfall, when sufficient phosphate is added to the soil, Hare's Foot Clover, Burr Medic, Hop Clover, Woolly Clover, and Clustered Clover all appear. Probably the pasture could be improved more quickly if small quantities of the seed of some of these, particularly of Burr Medic and Clustered Clover, the seed of which can be easily purchased, were sown with the last crop before a grazing period.

The importance of encouraging these leguminous species cannot be over-emphasised. They are very superior pasture plants to those in the existing pastures, having a better balance between proteins and carbohydrates. As they are mostly low creeping plants they thicken the pasture, filling gaps which would be left open by grasses and other herbage. They provide a residue, after maturity, that is not easily destroyed by wind or rain, and which is more useful and nutritious than that of the common grass and weed species. Although all of these clover species are annuals, when they begin to form a percentage of the pasture they will

continue to appear each year, and, should the plants become reduced in number, or appear weak and unhealthy, extra superphosphate will always improve the position.

In addition to actual grazing value, also, these leguminous plants serve a very useful purpose in the improvement of soil fertility and condition, because, alone of all orders of plants, the *Leguminosae* obtain their necessary nitrogen supplies not from the soil, but from the air. Colonies of bacteria form in nodules on the root system, and these have the power to fix nitrogen from the air for the use of the plant. Thus all residues of leguminous plants returned to the soil are a direct gain in nitrogen—which is one of the elements most likely to be lacking, particularly in sandy soils.

It will be found on Mallee farms that the clover species appear first, and develop best, on the heavier classes of soil, and those containing much lime, and that a greater reserve of phosphate is necessary to encourage them on sandhills. It is possible, however, with good management to cover even the sandy country with clover, and the ultimate value, both in the carrying of stock and the improvement of the land, more than justifies the trouble and expense incurred.

Burr Clover (*Medicago denticulata*).

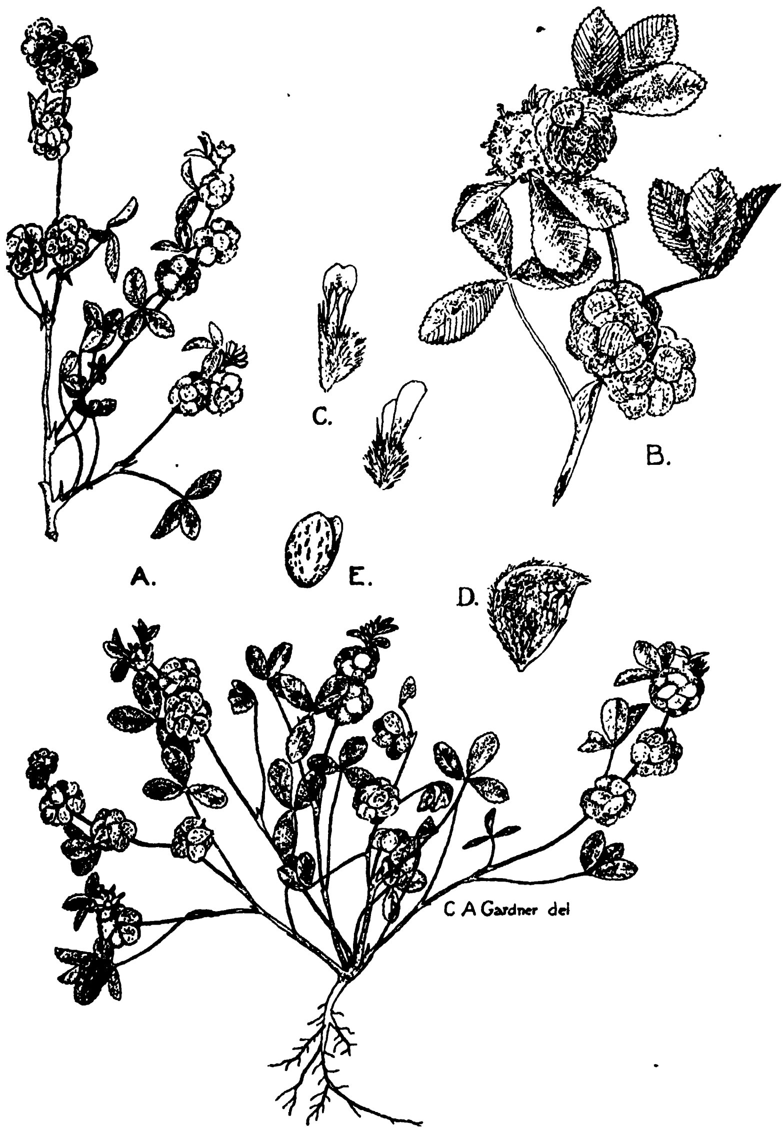
All of the leguminous plants which appear are not of equal value. The characteristics and relative value of those most common are as follows:—

Hare's Foot Clover (*Trifolium arvense*).

This is usually the first leguminous species to appear, and is an indication that the soil is reaching a condition suitable for clover plants. It is upright and slender in growth, not providing a great bulk of fodder. Although the analysis shows quite a high food value, this plant is not very palatable to stock, and is often neglected by them. It grows over a larger area of country and in lower rainfalls than most of the other species, but in general can be regarded as rather a poor specimen of leguminous plant, and chiefly useful as an indication that better clovers may be encouraged to grow by further attention and the use of more super.

Medics (*Medicago denticulata*).
(*Medicago tribuloides*).

The more common of these, *Medicago Denticulata,* is frequently called Trefoil, or Burr Clover. Both are extremely useful plants, and their appearance is generally recognised as an indication of land in good heart. Certainly their presence in pastures indicates increased stock-carrying capacity. They grow luxuriantly,



[From *Journal of Agriculture,* Western Australia.]

Woolly Clover (*Trifolium tomentosum,* Linn.).

provide a very large amount of grazing, and seed freely. Stock invariably do well in pastures containing a percentage of these Medics, which belong to the same plant family as Lucerne.

Although only annuals, their free-seeding habits ensure reproduction each year. The seed is useful in another respect also. There have been many instances where sheep, turned on apparently bare paddocks, have retained or even improved their condition on the seedpods alone of these plants. The seedpods are somewhat troublesome in the wool of sheep, being the chief cause of "burry fleeces," but manufacturers are now able to deal effectively with burry wool. Although it may be necessary to accept a somewhat lower price per pound for fleeces containing these burrs, it is generally recognised that the price per fleece is greater, as the improved pasture considerably increases the growth and weight of the fleece. On Mallee farms where these plants grow freely one of the chief problems of better stock-carrying capacity has been solved.

Hop Clover (*Trifolium procumbens*).

Woolly Clover (*Trifolium tomentosum*).
Hop Clover (*Trifolium procumbens*).
Clustered Clover (*Trifolium glomeratum*).

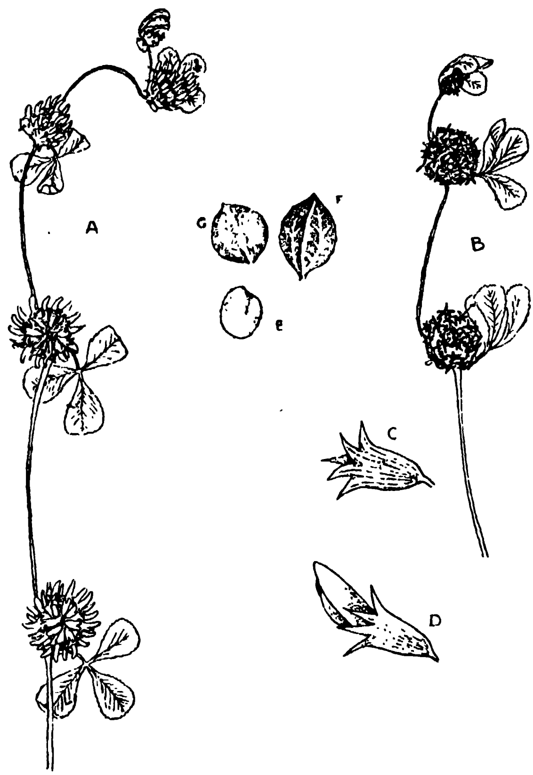
These *Trifolium* species, smaller in size of each plant than the Medics, and somewhat creeping in habit, also serve a very useful purpose in the pasture. They usually do not appear until Burr Clover is becoming established, and are all very nutritious and palatable to stock. Even after maturity they continue to provide good grazing. Because of their creeping habit they cover the ground, filling gaps that otherwise would not be utilised, and so increase the density of the pasture.

A pasture which contains good grass species, Burr Medic and these clovers is approaching the ideal in moderate to low rainfall areas. The seed of one of these, Clustered Clover, is usually quoted in seedsmen's catalogues at a very moderate price, and being very small in size, contains an enormous number of seeds to the pound, so that, if these smaller clover species are not apparent on the farm after adequate super dressings have been used, the sowing of 1lb. to 2lbs. of Clustered Clover seed per acre is an advantage.

The Mallee farmer who is situated in an area with over 12in. average annual rainfall, and who is interested in the keeping of livestock and the improvement of soil fertility and condition, can do more by using sufficient phosphatic fertiliser, thus encouraging growth of leguminous plants in his pastures than by any other means.

IMPROVEMENT BY THE SEEDING OF PASTURE SPECIES.

A great deal of experimental work has been done in the endeavour to find plants for these areas to sow a pasture after a cereal cropping programme, which will give good stock-carrying capacity without undue delay, and which will be sufficiently permanent to continue for a period of years. Unfortunately, although many species of plants have been tried, very few have proved successful, and of these there is only one true perennial plant, which is Lucerne.



[From *Journal of Agriculture*, Western Australia.]

Clustered Clover (*Trifolium glomeratum*).

A—Flowering branch. B—Seeding branch. C—Calyx (enlarged). D—Flower (enlarged). E—Clover seed. F—Sorrel seed. G—Sorrel seed with husk removed.

No perennial type of grass will live through the hot dry summer period which is so often experienced. It has happened on occasions that species like Perennial Rye Grass and *Phalaris Tuberosa* have lived for more than one season, usually when they have been fortunate enough to be established in a year with a summer of rainfall above the average, but normal summer conditions invariably kill them.

It appears, then, that sown pastures, with the exception of Lucerne, must be composed of annual plants, which can be depended on to seed sufficiently freely to re-establish the pasture each year.

Plant species which can be recommended for seeding under certain conditions are Lucerne, Wimmera Rye Grass, King Island Melilot, Evening Primrose, and Early Subterranean Clover, and the relative use of these is as follows.

Lucerne (*Medicago sativa*).

Lucerne is the most important and valuable plant which can be established as a pasture on Mallee farms, although it appears very difficult to persuade farmers that this is the case. Officers of the Agricultural Department have attempted for many years to persuade farmers in the semi-arid parts of the State to sow lucerne, but with very little success up to the present time. It is not intended in this article to discuss fully the problems of Lucerne growing, as in Bulletin No. 246 of the South Australian Department of Agriculture, "Lucerne Growing in South Australia," W. J. Spafford, Deputy Director of Agriculture, has already done so, but to deal only with those aspects which affect the mallee wheatgrower who is desirous of establishing better pastures.

Probably the chief reason why wheat farmers do not attempt the growing of Lucerne is that they have seen it grown under irrigation, where the stand is dense, the growth free, and several cuts are obtained each season. Obviously such Lucerne cannot be grown in areas where the only moisture received is the scanty rainfall.

Lucerne (*Medicago sativa*).

But in spite of the wide difference in conditions, Lucerne will grow in these areas. Lack of moisture will reduce the plants to one or two per square foot, or perhaps even less, but these plants will do what no other pasture variety can do—they will supply green growth through the greater part of the year, the only dormant period being in winter and early spring, when there is usually abundance of other pastures. Under normal circumstances the summer grazing will not be very much, but after each summer rain some growth will appear, often sufficient to give stock a much-needed change from dry fodders, a nutritious food high in protein content, which will improve health as well as condition; while in an abnormally wet summer the Lucerne growth can easily be greater than the farm stock can utilise.

Another reason why Lucerne has not become popular is that it has mostly been attempted only on small areas. These are unsuccessful, particularly if only part of a paddock is sown. If Lucerne is grazed too heavily, and the crown of the plant eaten out, it usually dies. Where only a part of a paddock is sown all livestock given access to the area will overgraze the Lucerne and so kill it. Also on small areas there is often a gathering of vermin—rabbits and hares—on the Lucerne patch, and these are more harmful than the farm livestock. If, therefore, the growing of Lucerne as a pasture is to be successful it must be sown on large areas and over complete paddocks. Where rabbits or hares are plentiful it will probably not be much use if only one farmer in a neighbourhood attempts to grow Lucerne, but when most of the community do so the damage done by vermin will not be appreciable.

When established, Lucerne will live through dry summers in the low rainfall areas, because of its deep rooting habit, but it must be grazed judiciously. It is not naturally a pasture plant, being more fitted for cutting, as fresh growth comes from the crown before the previous growth is mature, and if the new growth is grazed too soon the plant is weakened and its life shortened. Even under good grazing conditions, Lucerne usually does not live in these areas for more than four to six years, and only then if it receives annual top-dressing with superphosphate, but this life is much longer than that of any other pasture plant. The best management is to divide the area sown to Lucerne into comparatively small paddocks, and graze each in turn quickly with large numbers of stock. If it is possible to cut the first spring growth with a mower for silage or hay this is an advantage, as the cutting stimulates the plant, and the hard base of the cut stems prevents the stock damaging the crown for the rest of the season.

Cost of the seed was one of the reasons why farmers did not sow large areas of Lucerne. During recent years the cost of seed has decreased considerably, and the amount spent on 4 to 6lbs. seed per acre, all that is necessary in these areas for a pasture likely to last at least four years, is not very great.

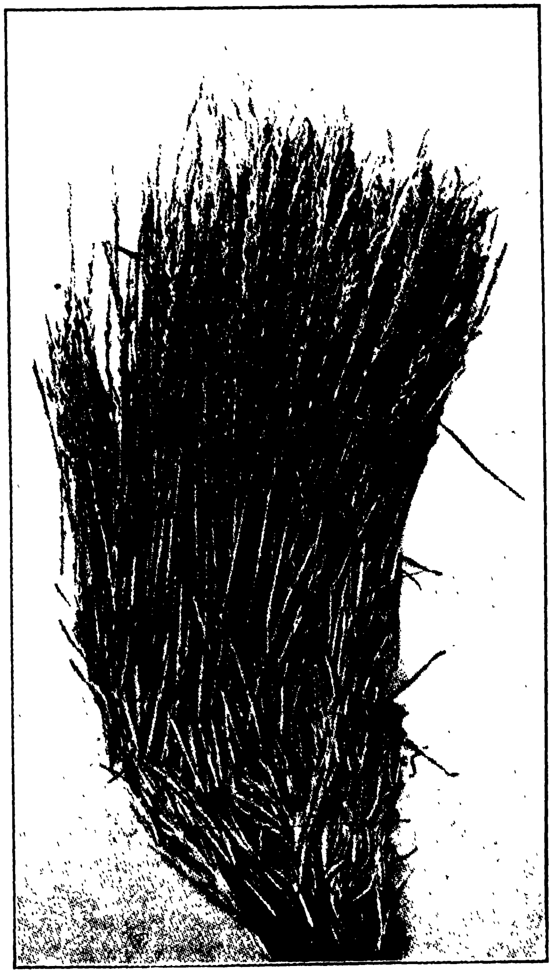
The majority of attempts by farmers to grow Lucerne to date have been by seeding it in a cereal crop. This often failed, as the cereal, in the later stages of its growth, reduced the soil moisture to such an extent that most of the young Lucerne plants died. For this reason it is now generally advocated that the Lucerne be sown with a disc drill, and a dressing of superphosphate through the stubble residue during the autumn months of the following season. This method is usually successful, though weed growth may kill out some of the young Lucerne plants. The most certain method is to sow on fallow land, with a light seeding also of an early maturing cereal, and to cut the growth very early in the spring for silage or hay. The advantage of cutting instead of grazing the first growth of Lucerne is considerable, enabling the plant to stool and establish a crown to better advantage, and where the cereal growth is removed early, sufficient soil moisture remains for the Lucerne.

When the first growth is grazed, it is essential to use large numbers of stock, to graze quickly and evenly, and to remove the stock before the plants are eaten too closely. If care is taken in developing the plants, and in subsequent grazing methods, there is no difficulty in establishing Lucerne pastures in wheat areas of moderate to low rainfall.

It is certain that when wheatgrowers become good keepers of livestock also, they cannot afford to be without Lucerne on part of their holdings, because it is the only possible permanent pasture plant, it gives a highly nutritious feed which balances the ration in conjunction with cereals, grasses, or the usual pasture weeds, and it gives green pasture during late spring and summer when the other plants which appear even in wet years, are likely to be species such as Buckbush and Paddymelon, of little fodder value.

Wimmera Rye Grass (*Lolium* sp.).

If Lucerne is the most useful of all sown fodder plants, Wimmera Rye Grass is certainly the next in importance. Although only an annual—probably a variation of Italian Rye Grass—it seeds freely, and continues in the pastures each year when once established. At present in the Murray Mallee area farmers are much more willing to sow this grass than to sow Lucerne. It is generally considered that Wimmera Rye Grass will grow wherever Barley Grass prevails. This is certainly so in this particular district, over the whole of which Barley Grass grows



[From Victorian *Journal of Agriculture*.]

A specimen of Wimmera Rye Grass.

freely. Good stands of Wimmera Rye Grass have been seen along the Murray River, and even north of it in the country with the lowest rainfall, averaging not more than 9in. to 10in. per annum, and throughout the area the higher the rainfall the better the growth of this grass. It should be on every farm because—

(1) It is the only grass species which has proved successful, and it can be established cheaply and easily.

(2) It provides a greater bulk than any of the natural grasses, matures rather later in the spring, thus giving a longer growing season, is palatable at all stages, provides good residue even after maturity, and has no objectionable features as a pasture.

(3) It will compete successfully with Barley Grass reasonably well in the low rainfall areas, and will almost entirely replace it in better rainfall parts. As Barley Grass leaves much to be desired as a pasture, and also acts freely as a host to Takeall, whereas Wimmera Rye Grass appears to be immune to this disease, or almost so, the advantage is obvious.

(4) It will grow on all classes of Mallee land, and, while preferring the heavier types, is not difficult to establish on sandy land, provided adequate super has been supplied.

Farmers often raise the objection that Wimmera Rye Grass develops into a bad cultivation weed, difficult to eliminate from fallowed areas, and usually appearing to some extent in the cereal crops. This is undoubtedly the case, but is more of an asset than a liability. A grass which was easily killed out on cultivation land could not be expected to persist in the pastures. It grows freely with the cereal crops, upright in habit, and not killing out any appreciable number of cereal plants, as some weeds do, while its presence ensures the re-establishment of the pasture the next year. Only with bad farming methods will Wimmera Rye Grass be a menace to cereal crops in low to moderate rainfall areas, and any slight reduction in yield from sown crops is more than balanced by increased stock-carrying capacity during the following years.

Wimmera Rye Grass likes cultivation. It usually does not continue to form the bulk of a pasture unless the area is cultivated and cropped periodically. If land is to remain as pasture for an indefinite period of years it will pay to cultivate the pasture occasionally. Cases have been seen where a strip of pasture land has been broken up with a cultivator, and the balance left untouched. On the cultivated strip Wimmera Rye Grass formed the bulk of the pasture, and on the remainder Barley Grass prevailed. Thus, on a permanent pasture paddock it would pay to use a combine once about every second year, with the points cultivating, and at the same time using the implement to apply a dressing of phosphate, as this grass responds very well to phosphatic fertiliser.

It is not a perfect pasture by itself, being, like most grasses, more fattening than flesh-forming, but Wimmera Rye Grass with Lucerne, or with the naturalised clover species which have been previously described is certainly the ideal pasture for the Mallee areas at present.

It can be established with little expense and with no extra labour. The usual method is to sow about 2lbs. seed per acre—which will cost approximately 1s.—distributing the seed in the fertiliser-box of the drill or combine each time the box is filled when sowing the last cereal crop before a pasture period. The cereal crop must of course be for grain purposes and not for hay. Wimmera Rye Grass is a free persistent seeder. Even when grazed heavily it forms seedheads close to the ground, while in a crop it produces a very large amount of seed. It is best established when a harvester or reaper-thresher is used to reap the crop, because then the light grass-seeds all blow from the back of the machine, and provide an even seeding for the next year. Where a stripper is used the majority of the Rye Grass seed will be gathered in the machine, and be eventually blown out from the winnower, while only the seed on some of the shorter stools is left in the paddock for the next season.

Wimmera Rye Grass has so many advantages over existing grass species that all farmers are strongly recommended to establish it on their holdings.

King Island Melilot (*Melilotus indica*).

This is an annual leguminous plant, which is sometimes called Californian Lucerne. It can be sown with Wimmera Rye Grass to provide the leguminous portion of the pasture where other species are not growing freely. Although it is nutritious, stock need to acquire a taste for this Melilot, and sometimes appear rather to neglect it. It is generally believed that King Island Melilot is more palatable when grown close to the sea than inland. It will grow, to some extent, in rainfalls of 12in. per annum, but is not luxuriant unless the rainfall is 15in. or over. It has proved useful on many farms, but Lucerne, with the Medicago and

[From *Journal of Agriculture*, Western Australia.]

King Island Melilot (*Melilotus indica*, All.).

Clover species, is preferable. It has a strong characteristic odour, very sweet when the plant is cut for hay, but rather objectionable in milk and dairy produce.

Wheat growers should be rather careful of establishing this plant, because wheat merchants and millers are loth to purchase wheat from farms where Melilotus grows freely, as the odour from the seed, when reaped with the wheat, tends to

taint the flour. It appears that this is not so to any appreciable extent if the Melilot seed is screened out before gristing of the grain, but is very definitely noticeable where any of the seed is ground with the wheat.

On farms where King Island Melilot forms a proportion of the pasture, clean fallow cultivation will prevent it becoming a danger in this respect. It can be recommended on farms where other leguminous species are not forming a sufficient proportion of the pasture plants.

Evening Primrose (*Oenothera odorata*).

Evening Primrose is a biennial plant which serves a very useful purpose. It is only of moderate feeding value, and usually does not form a dense pasture, but it grows nearly all the year where there is sufficient soil moisture, and often provides green feed for stock when no other species are available. The chief value of Evening Primrose is that it prefers sandy soils, and will grow freely on poor classes of white sand where it is not possible to establish other plants. Under favourable conditions the Primrose appears to live longer than the two years which constitute its normal life period.

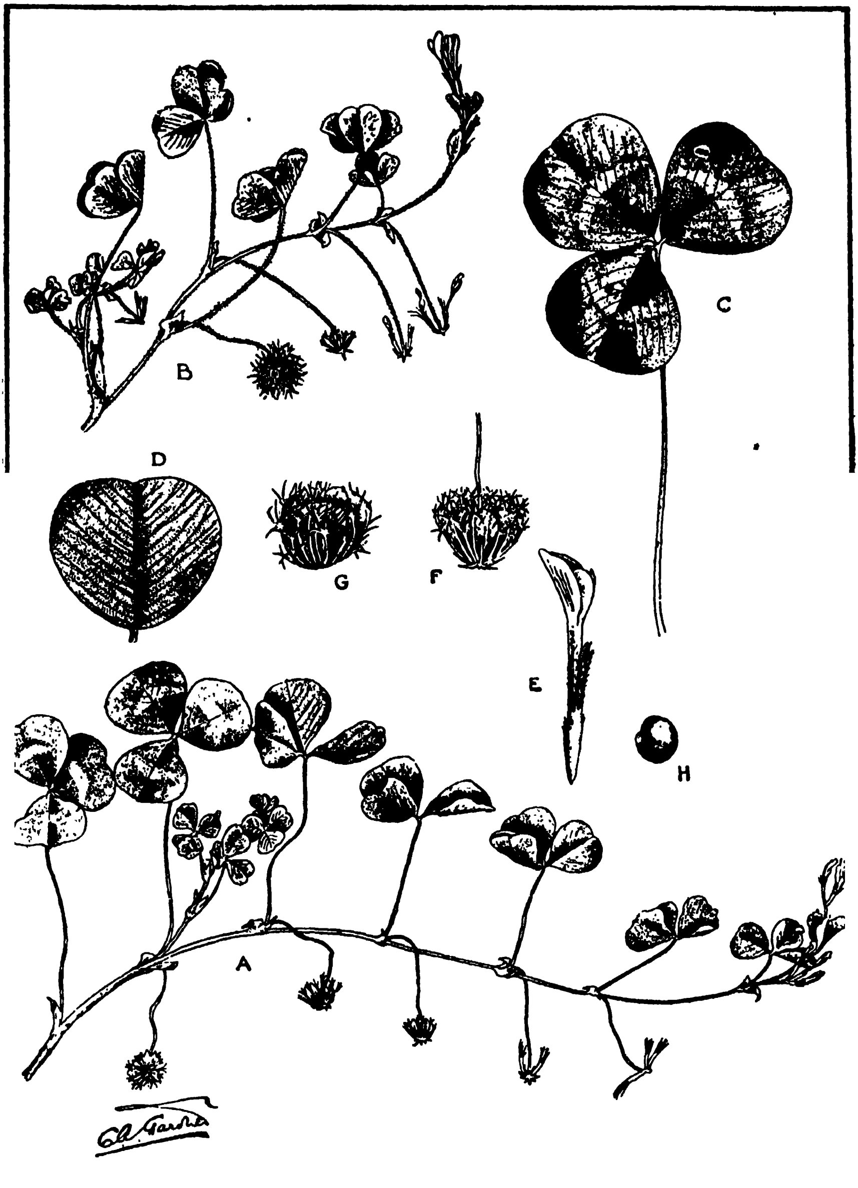
Evening Primrose (*Oenothera odorata*).

It will act as a sand-binder on drift sand areas, preventing the movement of surface soil, providing grazing for stock, and thus holding and improving the soil until eventually better pasture plants may be established. It is not likely to be successful in areas with under 14in. of rainfall, and is better in higher rainfall parts.

During the spring and summer months it develops a tall, hard, unpalatable stem, and seeds freely, so that the pasture remains permanent. To obtain maximum feeding value the stems should be cut with a mower after the seed has shed, so that the stock may easily reach the fresh growth which appears at the base of the plants.

Early Subterranean Clover (*Trifolium subterraneum*).

The original strain of Subterranean Clover has not proved successful in these areas. It is generally recognised that it needs a minimum rainfall of 20in. per



[From *Journal of Agriculture*, Western Australia.]

Early Subterranean Clover (*Trifolium subterraneum*, L.).

A and B—Portion of plant, showing habit and development. C—Leaf, showing whitish crescent-shaped markings. D—Leaflet with brown flecking (on veins near mid-rib). E—Flower. F—Maturing seed head. G—Ripe burr, with three pods. H—Seed.

annum. Subterranean Clover has been sown by some of the Mallee farmers. Should there be late spring rains the plant matures, develops seed, and appears again the next year. As soon as a normal dry spring occurs, however, the clover

plants die before maturing the seed, and, being only an annual species, do not appear again.

During recent years various research stations have selected earlier maturing strains, and by utilising the best of these, which at present is the Dwalganup strain, which comes from Western Australia, it is possible to establish Early Subterranean Clover in lower rainfall districts. Even now the limit of minimum annual rainfall is 16in. to 17in. The earlier maturity allows development of seed before hot dry weather kills the plants.

Although Subterranean Clover selections have yet only a very limited use in the better rainfall parts of the Mallee, it is likely that further selection work will evolve strains in the future which will be safe in still lower rainfalls. Subterranean Clover will grow on almost all classes of soil, and is established by sowing 2lbs. to 3lbs. seed per acre when top-dressing pastures, or in a mixture with other pasture species.

The subject of Subterranean Clover is fully dealt with in Bulletin No. 240 of the South Australian Department of Agriculture, written by W. J. Spafford, Deputy Director of Agriculture.

Blue Lupin (*Lupinus pilosis*).

The Blue Lupin is mentioned, not because it is a pasture plant, but because inquiries are often made concerning it, and it has received a certain amount of prominence during recent years. The Blue Lupin is not a pasture plant. Although a legume, and a soil renovator, it is not palatable to stock, which usually will not touch it.

It is worth growing as a sand-binder, and to hold badly drifted areas there is no better plant, where the annual rainfall averages 14in. or over. It will grow in somewhat lower rainfalls, but not very freely.

The only value of Blue Lupin to livestock is in the seed. Each plant produces a large amount of seed in pods, and each individual seed is somewhat larger than that of a garden pea. When ripe the pods burst, throwing out the seeds for a considerable distance. When the plants are mature and dead, the surrounding ground is covered with seed, and during the summer months sheep will enjoy the seeds, which are very nutritious. They invariable tramp sufficient of the seed into the sandy soils to grow a fresh crop of Lupin the next season, and so, although the plant is an annual, fresh plants grow each year.

GROWING OF CEREAL AND OTHER CROPS FOR GRAZING.

This article so far has dealt mostly with the improvement of pasture land which is not to be cultivated for a number of years. It frequently happens, however, that a paddock in a regular cropping rotation is used during one year for grazing. Stock are turned on to the stubble of the cereal crop, which provides bulk feed for two or three months. Autumn rains destroy most of the grazing value of the stubble itself, and the plants which appear afterwards often provide only low carrying capacity. There is usually a certain amount of self-sown crop, but not, except under unusual circumstances, enough to provide much grazing. In addition, various plants germinate and provide pasture. Where Wimmera Rye Grass and clovers are established on the farm, the pasture may be quite satisfactory, but in most cases the paddock will not carry many stock.

This can be greatly improved if cereals are sown. The amount of work involved need not be great, and so the cost of such seeding is kept to a minimum. The usual procedure is to use a disc drill, and, early in the autumn months, to sow seed and fertiliser without previous cultivation through the stubble residues. Farmers frequently sow these grazing crops without super, but this is not advisable, unless it is certain that the soil contains a considerable reserve of phosphate, which is unusual on Mallee farms. The addition of super will do much to improve the bulk

and quality of the grazing. It is wise also to seed heavily, not using only the quantity proved most useful for grain or hay crops. Livestock are certain to bushels per acre is proportion of the plants while grazing, and so a seed quantity of 1½ to 2

All of the cereals—wheat, oats, barley, ... grazing crops and each is useful in a particular way.

Wheat.

As a general rule wheat is not used to any great extent. Farmers have learned, because of the prevalence of diseases such as Takeall and Flag Smut, that it is wiser to assist in reducing these diseases by keeping the land as clear as possible of wheat plants during the rotation period between the grain crops. Where these diseases are not a serious menace wheat plants will provide good grazing, nourishing and palatable to stock, although not growing so quickly during the winter months as barley or rye will. If wheat is used for this purpose, comparatively early, vigorous, quick-growing varieties are best, such as Sultan, Sword, Ford, Gluyas, Waratah, Nabawa.

Oats.

Oats are most frequently used. They provide good pasture, but most of the varieties in common use are rather slow starting, and so do not give a bulk of feed when most required, early in the season. They are certainly the best of the cereals for providing grazing during the spring and early summer months, recovering, after grazing, better than wheat or barley does. Oats of the Algerian type are not very palatable to livestock, which will prefer any of the other cereals to them if given a choice.

None of the varieties in common use in the Murray Mallee District at present is quite satisfactory but a good deal of interest is now being shown in the use of oats as a grazing crop and it is probable that in the near future more useful types will be developed. The varieties now in general use are Algerian which is somewhat unpalatable and slow growing during the winter, but is useful for providing feed late in the season; Palestine, which grows quickly, but does not recover well after being grazed; Early Burt and Lachlan, which are fairly satisfactory; Mulga, which at present appears to be the most useful, being a vigorous, quick grower and evidently palatable to stock at all stages of growth.

Barley.

Barley serves a useful purpose as a grazing crop. Although susceptible to Takeall, it does not appear to be attacked by this disease to the same extent that wheat is, and, while it might be wiser to avoid both of these cereals for grazing where Takeall is a menace, barley would probably not be so dangerous in this respect as wheat. Barley has the advantage that it thrives on light soils, and will grow quickly during the winter months, thus providing early feed.

The disadvantages are that the plant is somewhat shallow and fibrous-rooted, more likely to be pulled out by stock than the other cereals, and, while good winter feed is provided, barley does not recover well after grazing later in the season. It is generally considered that the six-row types provide more bulk of pasture than the two-row malting kinds. Varieties not used to any extent in this district are the skinless barleys, such as White Skinless and Black Hulless. It is generally considered that these are the quickest growing of all, and so are worth a place for early winter grazing.

Rye.

Rye is the most hardy of all the cereals, and is rapidly gaining in popularity for use as a grazing crop. It thrives even better than barley on light soils, and is often successfully used as a sand binder on drifted areas. Rye is a quick, vigorous grower, will provide very early feed, recovers well after grazing, and is quite palatable to stock during the early stages of its growth.

It becomes tough and fibrous as the plant nears maturity, and stock will then neglect it. Thus a pasture of rye should be kept hard grazed, unless it is intended to use it for winter pasture, afterwards allowing the crop to grow for silage There hay, or grain, which, with a plant so vigorous as this, is easily been taken from the have been cases in this district where two cuts
one rye crop

Mixtures of Cereals.

It will be noted that none of the cereals is an ideal grazing crop. Some provide feed early and not late, the others *vice versa*. Thus there is a considerable advantage in using a mixture of the cereals, always including either barley or rye to provide the winter feed, and wheat or oats for the spring period. Where there is danger from Takeall, rye, and oats would be the safest mixture. All of the four may be mixed together if thought desirable, and as a mixture of cereals always grows more vigorously than any separate one of them—provided plenty of seed is used, with sufficient super, to stimulate the growth—quite high stock-carrying capacity can be obtained in this way.

It is not wise to use more than one mixture in any paddock, nor more than one variety of any cereal sown separately, as if this is done it frequently happens that one variety or mixture proves more palatable than the others, and so a part of the paddock is grazed too hard by the stock, and the remainder neglected.

Mixture of Cereals and Legumes.

A pasture consisting only of cereal plants is likely to be rather more fattening than flesh forming, and would be improved by the addition of some leguminous plants. On some farms these will appear naturally, in the form of the Medics and Clovers, and so the ration will be balanced. Where Clovers are not present it would be an advantage to sow a leguminous plant with the cereals, but the choice is very limited. Seed of Burr Medic and Clustered Clover could be sown with the cereal grazing crop, in the areas where these plants are likely to establish themselves.

Field Peas, of the Dun and White Brunswick varieties, grow quite well during winter and spring months in this district, but these do not recover after grazing, and so are of no use for this purpose. They can be sown alone in the better rainfall areas, particularly the earlier White Brunswick variety, and allowed to grow until almost mature, then used for fattening sheep or lambs for market, for which purpose this crop is well suited.

The only other plant worth considering is the Common Vetch (*Vicia sativa*). Vetches, or Tares as they are often called, are leguminous plants, hardy, free-growing, and frequently used elsewhere in forage mixtures. They will grow quite well in the moderate rainfall areas, and will recover after grazing. The addition of 8lb. to 10lb. Vetch seed per acre to that of the cereals would definitely increase the carrying capacity and make the forage more nutritious.

Some care must be taken with Vetches on wheat farms. They should only be used in a mixture which is to be hard grazed and not allowed to reach maturity or which is eventually to be used for silage, so that the seed does not mature. The Vetch can easily become a weed on a wheat farm, and is then very troublesome, as the seed is one of the very few which it is almost impossible to remove from wheat grain by any type of seed grader.

Summer Fodder Crops.

Very few attempts have been made to grow summer fodders in these areas. Because of the low rainfall and the usual dry hot summer, it is not possible to depend on the successful growing of summer crops. There have been some instances, however, when heavy rains happened to fall during the late spring or early summer months, of good growth being obtained from Sudan Grass.

This is likely to be the only summer fodder worth considering, as it is the most drought-resistant of all the crops whose growing period is during the hot months. It is probable that a good deal could be done with Sudan Grass in some years, particularly when preparation had been previously made by fallowing a paddock as early as possible during the autumn, and subsequently keeping it clear of plant growth by cultivation until the spring. Sudan Grass sown on such prepared land during September or October, at the rate of 6lbs. to 8lbs. seed per acre with super would have a reasonable chance of success.

The cost of the operation would not be great; if the crop should fail the land will remain as fallow for the next season, and the risk is worth taking by the man interested in his livestock, as even a small ration of green forage, when usually all the pasture is dry, would be very beneficial.

Certain precautions must be taken in the feeding of Sudan Grass to stock. It is a member of the Sorghum family, and all plants of this family, under certain circumstances, are likely to be poisonous. It was thought that Sudan Grass was safe, and that any cases of poisoning came from mixtures or hybrid plants growing with it, but recent experiences of stockowners in South Australia show that Sudan Grass itself can be dangerous.

The stock poisoning is due to the development of prussic acid in the plants during the early stages of growth, especially if that growth has been checked in any way. When the plants reach the flowering stage all danger is past. Stock therefore should not be allowed to graze Sudan Grass until it reaches the flowering stage. If cut and wilted for some hours before feeding it is safe at any stage of growth. With the limited amount of rainfall available, it is not likely, in the Mallee, that there would be more than one growth of Sudan Grass during the growing period, although with sufficient moisture several can often be obtained between spring and autumn, so that to use it economically it might be best to cut the crop, and feed it as a partial ration to supplement the usual grazing.

THE USE OF CONSERVED FODDERS.

In districts of low to moderate rainfall the usual green pastures for stock grow only from six to eight months of the year, and the natural grazing for the balance of the year—quite often from December to May or June—is poor. It has been mentioned previously that the residues left after maturity of many pasture plants are not very nutritious, and the same may be said of cereal stubbles. Stockowners meet this shortage in one of two ways, either by reducing the number of livestock kept during this period, or by hand-feeding of conserved fodders to supplement the grazing.

Where farmers are growing lambs for local or export trade requirements they endeavour to dispose of them before summer weather dries out the pastures. This cannot be done unless lambing is early, and early lambing is not safe in these parts, where the opening of the season is often late, unless provision is made to hand-feed the ewes.

Many farmers keep a small permanent flock, and buy more sheep when they have a surplus of feed, selling again when a shortage occurs. This is often not profitable, and it is certain that if the farm flocks are to be reduced in number periodically to avoid overstocking during the lean period, the keeping of sheep will never reach its greatest profit. If farmers wish to keep the maximum number of livestock in these districts they must consider hand-feeding as a part of the regular farm routine during three or four months of most years.

Cereal Grain for Hand Feeding.

After a normal season considerable residues remain on pastures and stubbles. These are low in feeding value, and it is not to be expected that a breeding ewe can satisfactorily grow a fleece, develop a lamb, and maintain the lamb after birth on such bulk feeds alone without the addition of some concentrates. Farm-grown concentrates are likely to be the most economical, and, on Mallee farms, these will be provided by cereal grains, which can be stored in bulk on the farm without much expenditure, using tanks or barns for the purpose. Storage in bulk is the only satisfactory method. All of the cereal grains are useful for this purpose—rye, wheat, oats, and barley. An amount of 1lb. to 1½lbs. per sheep per day of these grains, with roughage, will provide a full ration.

Rye is not grown to any extent at present for grain purposes, and so is not likely to be used. *Wheat* is chiefly grown for marketing, and is not greatly used for stock feeding, although when the price is low it might be more profitable to do so. Recent tests made through the Department of Agriculture have proved that pinched or shrivelled wheat has a high stock-feeding value, being greater in protein content than full grain so that rather than accept a reduced price for wheat of this kind, it can be better utilised for the feeding of stock.

Barley and *Oats* are the grains usually available, as the growing of at least one of these crops forms a part of most crop rotations on wheat farms.

Oat grain is most commonly used at present, and is a very satisfactory concentrated food. It, as well as the other grains, can be fed best through some type of self-feeder, as then all members of the flock have a reasonable opportunity to obtain a fair ration. These grains can also be fed quite well by spreading out on an area of bare hard land, provided they are spread sufficiently for all of the stock to obtain their share. *Barley* grain is very useful. The digestible protein content is usually less than that of oats, and so the grain is not quite so suitable for breeding ewes, but as a maintenance ration it is quite satisfactory. Barley gives very good results if sprouted before feeding. This can be done in the following manner. Use about 1½bush. of grain in a 3bush. bag, tying at the top. Soak the bags in shallow troughs partly in and partly out of water for 24 hours, turning two or three times. Allow to stand for a further 24 hours, when the grain will be found to be definitely sprouting, except in very cold weather, when a longer period may be necessary. There have been cases where ewes with lambs at foot have kept their condition, and have grown the lambs very quickly on a ration as low as ¾lb. sprouted grain per head per day. The effect of this treatment appears to be that the grain becomes more digestible.

It must be remembered, when hand-feeding grain to stock, that the full ration must not be commenced suddenly. This applies to all changes of feed, but more particularly to grain. Severe digestive and other troubles, including a break in the wool, may occur from the sudden change. A small amount must be given at first, gradually increasing each day until the full quantity is reached.

Use of Hay and Chaff for Hand Feeding.

During dry years, when there is a definite shortage of pasture, more bulk must be supplied, as ruminant animals need some bulk of food to ensure good digestion. Hay or chaff can be made to serve this purpose very well, but not hay as it is so often made by farmers. A large proportion of hay on farms is cut when the plant is so mature that the hay consists of grain and straw. Horses appear to do quite well on this, but other livestock do not. If hay of this class is fed to sheep the heads will be eaten, and most of the straw wasted. Even when cut into chaff and fed from troughs or self-feeders the position is not much better, as the stock will use the grain and leave the balance if possible.

Hay need not be cut at so late a stage. Cereal plants contain their full nutriment at the flowering stage, though not their full weight of dry matter. Until the grain reaches the milky stage the nutriment is evenly distributed throughout the plant, but after this period most of the food constituents move upward, until, at maturity they are nearly all in the grain. Hay for the feeding of farm livestock, therefore, should be cut during the period between the flowering of the plant and the milky stage of the grain.

Some farmers state that the hay is more troublesome to cut and cure at this stage, but the difficulties are not great. Sheaves should be made small in size, to avoid any danger of moulds forming in the centre of the sheaf, and long open stooks should be made, so that the moisture evaporates quickly. A decided advantage to farmers in cutting hay at this stage is that the hay season is earlier, and more easily completed before the reaping of ripe grain commences.

All of the cereals make better hay at this stage. Barley awns are not hard, and not likely to be troublesome to the mouths of livestock, as they are when near maturity. Rye has not become tough and fibrous, and wheaten and oaten hays are more nutritious. It is generally believed that if Algerian oats are cut green for hay, the product is bitter and unpalatable. This may be so, although it is not at all certain, but in any case there are many other oat varieties which could be used for this purpose. New green cut hay has some tendency to cause scouring in livestock, but this tendency disappears after the hay has been stacked for a few months.

When sowing hay crops for the feeding of livestock it should be remembered that a mixture of varieties will produce a greater quantity per acre than any single cereal; thus wheat and oat, or oat and barley mixtures, are commonly used for this purpose.

Cereal hay is high in digestible carbohydrates, and somewhat low in digestible protein, and therefore is decidedly better for maintenance or fattening purposes than for production of milk in ewes, or the growth of the lamb. It is better if some legume can be included. On some farms clover grows to such an extent that the butts of hay sheaves include clover plants. This is a satisfactory state of affairs, but unfortunately is more the exception than the rule on Mallee farms at present.

It is possible to include a legume in the hay crop, and the product would be better for stock feeding than any hay now produced. A very fair growth of Field Peas can be obtained in areas of 14in. or more average annual rainfall. Because of quick growth and earlier maturity the White Brunswick variety is better for this purpose than the Dun pea. A mixture sown for hay with seed consisting of ½bush. of peas, with ½bush. to ¾bush. per acre of a tall-growing, early-maturing variety of oats or wheat should be very satisfactory, and the success would be more assured if this were sown on fallowed land. The pea plants will grow with the cereal, climbing the wheat or oat plants as they grow taller, so that a mixture of this kind can be cut for hay with the binder in the ordinary way. In a dense heavy crop some tangling occurs, and adjustment to the outside divider of the binder may be necessary. This consists of the attachment of a revolving coulter to the front of the divider, adjusted to run on the ground, and a scythe blade set edge up on the top of the divider, to cut any overhanging growth. Naturally a crop of this kind could only be handled in well-cleared paddocks. Curing and stacking is no different from that of all cereal hay.

This would supply a balanced ration, and the feeding of 3lbs. to 4lbs. per head per day to sheep with lambs should be approaching the perfection of hand-feeding.

Silage for Livestock.

Mallee farmers have been growing crops for grain and hay ever since the country was first cleared, and are more or less familiar with the use of these products for livestock feeding; but only very few of them have made or used silage. Because this product itself, and the method of its manufacture, are so different from anything in their past experience it is very hard to convince them of its value.

Silage is the only food product which will retain the natural juices of the plant in addition to its nutriment, and which can be said completely to take the place of green forage. It will stimulate milk secretion in dairy stock better than any other foodstuff, and the same applies to breeding ewes. Silage will enable breeders to develop lambs well, and early in the season, when market prospects are at their best, and to be successful in this way every year, irrespective of seasonal conditions —in fact, so important is this food product that no breeder of stock should be without it if there is any intention of attaining maximum stock-carrying capacity.

Much has been written recently in South Australia concerning the making and utilising of silage, so it is intended here to mention only some facts which may be useful to Mallee farmers. A number of these farmers have attempted to make silage in stacks, and their efforts have frequently been unsuccessful, or only partially successful. The product obtained has usually been dark in colour, with considerable waste material. On an ordinary wheat farm, with limited labour, it is difficult to make satisfactory silage in stacks, particularly where cereal crops are used and cut into sheaves with the binder. The crossing of the sheaves in the stack allows air spaces, and these, together with the air in the hollow stems of the plant, are the causes of unsatisfactory results.

Also the work involved in building the stack, and in weighting it down afterwards, without any labour-saving machinery, is very great. If stacks are to be made, the method now adopted at Roseworthy Agricultural College, of a stack held within a framework of upright poles, so that all the sheaves may be placed in the one direction, is the best.

A better method of silage making in these areas is undoubtedly in trench silos, as in most of these soils the trenches can be easily scooped out by horse labour, and the rainfall is not sufficiently high to cause much danger of flooding the trenches at any time. These trenches are made long, comparatively narrow, and usually from 6ft. to 9ft. deep. The labour of filling them is much less than that of a stack, as team and loaded wagons are driven through the trench over the material already collected, thus assisting in pressing out the air; the sheaves are thrown down from the wagon, and spread all in one direction, lengthwise in the trench; and when the filling is complete, horses and scoop can again be used to supply ample weight of earth over the top.

Some very good samples of trench silage have been made by farmers in the Mallee. There is very little risk of failure, and farmers who once utilise silage for feeding sheep or cattle always wish to continue its use. Trenches of this kind can be made permanent by building stone walls along the sides, as smooth as possible on the inside surface. Where limestone is available, which is the case in many parts of these areas, this can be done economically with stone and lime cement, and it prevents all danger of the side walls falling in, which sometimes happens, particularly in the more sandy soils.

Cereal crops make good silage, but even better can be made from grass and clover mixtures when there is a surplus of pasture, or from the pea and cereal mixture previously mentioned.

Full information concerning silage, general conservation of fodders, and their use for livestock, can be obtained from the following publications of the South Australian Department of Agriculture:—

Bulletin No. 102—"Equivalence of Livestock Foodstuffs and Feeding Rations," by Arthur J. Perkins, Director of Agriculture.

Bulletin No. 274—"The Manufacture and Utilisation of Silage," by W. J. Spafford, Deputy Director of Agriculture.

Journal of Agriculture, Vol. 38, No. 7—"The Conservation of Fodders under South Australian Conditions," by Dr. A. R. Callaghan, Principal Roseworthy Agricultural College.

FARM SUBDIVISION AND WATER RETICULATION.

To attain maximum stock-carrying capacity it is necessary not only to provide the right quantity and kind of pasture, but to subdivide the farm area in such a way that the stock may obtain a change of paddock at reasonable intervals. Mallee farms are more faulty in this respect than those of most districts, partly because they have not been cleared for so long a period, but also because very often in these areas fencing-posts are not obtainable locally, and so are more costly.

A well-planned subdivision system is essential for livestock farms, while cereals can be grown in paddocks of any area. One of the best systems is a double fence enclosing a lane through the middle of the farm from end to end in one direction, with all subdivision fences at right angles to the lane. This is particularly useful if the farm buildings are in the centre of the area, as they should be. All paddocks then have direct access to the lane and to the farm headquarters. Unfortunately, many Mallee farms are irregular in outline, making a plan of subdivision more difficult.

Subdivision alone will greatly increase stock-carrying capacity. The grazing of a few head of stock on a large paddock is always wasteful, as parts of the paddock are favoured and others neglected; while also the better pasture species will be picked out, sometimes to such an extent that they are destroyed, while the remainder will not be grazed at all. It is a common sight on a Mallee wheat farm to see a small sheep flock in a paddock several hundred acres in extent. The opposite can be seen on properties of intense culture, such as Wood's Point, on the reclaimed Murray Swamps, where thousands of sheep graze paddocks only a few acres in area, being changed every few days to a fresh paddock, and coming back to each periodically for another grazing period. Rotational grazing such as this has given astonishing increases in carrying capacity. It is utterly impracticable, of course, in districts dependent only on scanty rainfall for their pasture, except as a demonstration of the value of closer subdivision.

Livestock remain more healthy, also gain growth and condition better, if they are given fresh grazing areas at frequent intervals. In small paddocks the grazing can be close and even, and the stock removed at the right time for the pasture to recover. Also on a well-subdivided farm growing and fattening stock can be given the best of the grazing, with store stock following on each paddock to clean up the residue.

Farm subdivision has hardly commenced on many properties, and, as it is costly, improvement may be slow. It is certain, however, that with livestock development smaller paddocks are essential, until eventually the average area per paddock will be something between 50 and 100 acres.

Equally essential is the provision of water for the stock. On most Murray Mallee properties sub-artesian water is available in unlimited quantities. All farms are provided with one or more bores, windmills, and storage tanks, but on most of them there is little or no reticulation. Livestock cannot be expected to do really well if they are forced to travel long distances daily for their supply of water, and so, as soon as possible, it is necessary that water be carried in pipes and supplied by troughs to each paddock.

The development of stock-carrying capacity in these areas will be a gradual process, but it is essential that all farmers should do their best in this respect, as only by so doing can the farms improve in productivity and income, while, if the keeping of livestock is neglected, within a short period of years there is a definite danger of many farms becoming useless either for crops or pasture, because of impoverished soil and increasing sand drift.

SUMMARY.

(1) Country of light soils and moderate rainfall will not stand continued cereal cropping. Humus content and fertility decrease, while sand drift becomes a menace.

(2) The only practical way to restore depleted fertility and humus content is by the keeping of livestock. Sheep are the most useful livestock, and should develop into an important industry, and not only a sideline.

(3) To enable farmers to keep large permanent flocks of sheep, carrying capacity must be increased. This is possible by—

- (*a*) The improvement of existing pasture species, and the encouragement of better species by adequate dressings of phosphatic fertiliser.
- (*b*) The introduction, by seeding, of better species.
- (*c*) The growing of cereal or other crops for grazing.
- (*d*) The use of conserved fodders for hand-feeding.
- (*e*) Smaller paddocks and better provision of water.

(4) Chemical analyses of pasture species show that many of the natural pasture plants are deficient in food constituents, chiefly protein, and that others which can be encouraged by the use of phosphate, or by seeding, are better in this respect.

(5) Pastures which develop naturally consist chiefly of Spear Grass, Barley Grass, Silver Grass, Brome Grasses, Wild Mustard, Wild Oats, Geranium, Cape Dandelion, and Mediterranean Grass. Of these the grasses are annuals, with a short growing period, and leave little residue of value after maturity. Mediterranean Grass appears to be the best of them, and the recent replacement of Barley Grass by it is an advantage. Geranium appears on pasture land, but is of only moderate feeding value, while the remainder are cultivation weeds which are never likely to give high carrying capacity unless supplemented by other species. In addition, the seeds of Spear Grass, Barley Grass, Rigid Brome Grass, and Geranium are harmful to stock.

(6) The bulk and quality of pastures can be improved by the use of superphosphate, while, in areas of over 12in. rainfall, leguminous plants can be encouraged to grow also by the same means. The higher the rainfall, the better the leguminous plants develop, the most useful of which are Burr Medic, Clustered Clover, Hop Clover, and Woolly Clover. These legumes, with the natural pasture species, considerably improve the carrying capacity.

(7) Many sown species have been tried experimentally, but only few have been successful. Those which can be recommended for seeding under special conditions are Lucerne, Wimmera Rye Grass, King Island Melilot, Evening Primrose, and Early Subterranean Clover.

(8) Lucerne is the best of the sown fodder plants because it is perennial, and will provide growth of high protein content through most of the year. It should be established over large areas and on complete paddocks, and should be grazed judiciously, not eating out the crown of the plant. It may be estabilished by seeding 4lbs. to 6lbs. per acre with super in stubbles, or by seeding with an early cereal crop to be cut for silage or hay.

(9) Wimmera Rye Grass is easily the best grass for Mallee farms. It will grow wherever Barley Grass prevails, provides greater bulk than any other grass, has a longer growing season, is palatable at all stages, provides good residue after maturity, has no objectionable features, and can be established cheaply and easily. It is usually established by sowing about 2lbs. seed per acre with a cereal crop, provided the cereal crop is sown for grain, and reaped with harvester or reaper-thresher.

(10) King Island Melilot will give leguminous pasture in the absence of other species. It is not very palatable, and needs about 15in. rainfall per annum to grow luxuriantly. Wheat-growers should not allow this Melilot to develop in their wheat crops, as merchants and millers claim that the odour from the seed affects the wheat flour.

(11) Evening Primrose will grow on light sands; it acts as a sand-binder, is a biennial, and supplies some growth during most of the year, but is only of moderate feeding value. It is useful in light country until better species can be established.

(12) Early Subterranean Clover has only a limited use on Mallee farms, as even the Dwalganup strain needs a minimum annual rainfall of 16in. to 17in., while later maturing strains are killed by the hot dry summer conditions before maturing seed.

(13) On areas to be used as pasture for only one year more stock may be carried if cereals are sown for grazing. All of the cereals are useful; wheat and oats provide good spring grazing, while the quicker growing barley and rye provide more early feed. Mixtures of barley or rye with wheat or oats are better than single cereals, while all four may be utilised together if thought desirable. Because of differences in palatability only one mixture should be used in each paddock. Heavy seeding, with the addition of superphosphate, is advisable.

(14) The sown cereal pasture is improved if a leguminous plant is added. Seed of Burr Medic or Clustered Clover can be used, while the Common Vetch will also make a good mixture with the cereals. Care should be taken on wheat farms not to allow Vetch plants to mature their seed, as it cannot be removed from wheat grain.

(15) Summer fodder crops are difficult to grow because of the low rainfall. Sudan Grass may be successful in some years if sown on prepared land, and would provide useful green forage during summer. Sudan Grass should only be grazed after reaching the flowering stage, because of the danger of poison.

(16) In areas of moderate rainfall pastures only remain alive for 6 to 8 months of the year, and if permanent flocks are kept, must be supplemented by the feeding of conserved fodders during the lean period.

(17) Where bulk foods are available—pasture residues or stubbles—grain at the rate of 1lb. to 1½lbs. per sheep per day will adequately provide for the necessary concentrates. Shrivelled wheat is useful for this purpose, while oats and barley are also satisfactory. More benefit seems to be obtained from barley if it is sprouted before being fed to the stock.

(18) Where no pasture is available, bulk foods are necessary, and hay can be utilised. Hay for this purpose should be cut between the flowering stage and the milky stage of the grain—not later. At this stage all of the cereals may be used—wheat, oats, barley, or rye—while a mixture of field peas with wheat or oats makes an ideal hay for feeding livestock.

(19) Silage is the only food product which retains the succulence of the plant in addition to its nutriment. It stimulates milk secretion, and is therefore of great value to breeding ewes. It ensures marketing of lambs at the right time, and so is almost essential to stock-breeders. The best and most economical method of silage making on Mallee farms is in scooped trenches, as the labour involved is less than that of building stacks, and satisfactory results are more certain.

(20) Maximum carrying capacity cannot be attained unless the farm is well subdivided, so that grazing livestock may have frequent changes of feed, and each paddock grazed evenly in reasonable time; or without reticulation of water supply, in order that the stock may obtain water requirements without walking long distances each day.

PARAFIELD EGG-LAYING COMPETITION, 1934-35.

[A general review of the Competition by C. F. Anderson, Government Poultry Expert.]

The Competition which concluded at Parafield Poultry Station on 31st March, 1935, was probably one of the most instructive of the series conducted at this Station.

As in all other Competitions under the supervision of the South Australian Government, the test covered the full period of the year, commencing on 1st April, 1934.

In order to provide for the increasing demands of the poultry industry, the Government increased the number of pens from 243 to 501.

Highest Score in Competition—274 first-grade eggs. White Leghorn pullet owned by Mr. S. Hill, Bridgewater.

The Competition was all single testing. The weighing of each individual egg throughout the currency of the test was continued, and it is emphasised more each succeeding year that this is the only system of egg weighing that gives an accurate record of the performance of each bird.

For many years it was considered that the bulk weighing of eggs during the month of July was a fair indication of the average weight of egg to be produced by respective birds for the remainder of the first laying season. Again, it was considered doubtful if the average pullet, which commenced laying some time in April and did not produce eggs weighing 2ozs. during the month of July, would reach the 2oz. minimum during her first laying season.

The continued and very accurate weighings conducted at Parafield Egg Laying Competition have proved that a number of ideas concerning the weight of eggs have been without foundation.

I would emphasise the importance of accurate weighing in Competition work; this is, in fact, the crux of the whole Competition. The principle adopted at Parafield is to weigh to the nearest fraction of an ounce.

After closely studying the weighing of the eggs, it has been found at Parafield that there is a considerable variation in the weight of eggs according to the number of eggs laid by some birds.

Some birds will lay a sequence of five eggs, miss a day or two, and then lay another sequence of five or six eggs. It has been found in most cases that the size of egg laid by a number of birds would probably weigh the full 2ozs. at the commencement of the sequence, but by the time the fourth and fifth egg have been laid the weight has dropped to 1⅝ozs. or 1¾ozs. After the bird has stopped laying for two or three days, and started again, it has been found that the first egg laid is 2ozs., but with regular production the size gradually falls away again. For Competition work it is apparent that the deciding factor is between heavy laying stock producing eggs of standard weight, and stock producing only a small per-

Home Project Utility Section. Winning bird owned by Master Eric Pratt, of Abattoirs. Winning score, 247 first-grade eggs.

centage of full-size eggs, and a large number of under-sized eggs. A study of the percentage of first grade eggs laid during the periods of the various weighings is very interesting, and shows just where the weakness in the majority of competing birds is, as regards the weight of eggs.

For the initial weighing period, that is from 1st April to 31st May, a weight of 1¾ozs. was the standard for first grade eggs, and 89 per cent. of all eggs laid were first grade, while for the second weighing period, that is, from 1st to 30th June, 1⅞ozs. was the minimum for first grade eggs and 89 per cent. of all eggs produced were first grade.

From 1st July to 31st March the standard for first grade eggs was a minimum of 2ozs., and the percentage of first grade eggs decreased to 77 per cent. This fact emphasises the importance of breeders striving to increase the percentage of 2oz. eggs during the most prolific laying period of the year, also during the period

when the bulk of the eggs are exported overseas. It has been conclusively proved over a period of many years that the 2oz. egg is the most profitable one from an export viewpoint.

The following is the number of birds entered for the Competition:—

Section 1.—*Wet Mash.*		
Class 1.	White Leghorns	333
Class 2.	Any other light breed	15
Class 3.	Black Orpingtons	63
Class 4.	Any other heavy breed	30
Section 2.—*Dry Mash.*		
Class 5.	White Leghorns	12
Class 6.	Any other light breed	(no entries received)
Class 7.	Black Orpingtons	9
Home Project Utility Section.—*Wet Mash.*		
	White Leghorns	19
	Black Orpingtons	3
	Rhode Island Reds	1
	Total birds competing	485

The Home Project Utility Section, in which 23 entries were received, is for scholars who are taking poultry as a Home Project in the State schools. This Section is an incentive to the scholars to breed only the best of stock and is one deserving of every support. It is very pleasing to see that a number of scholars, who have graduated through the Home Project System of poultry keeping, are now making very definite advance with the industry as a means of livelihood.

It will be seen, therefore, that with 485 birds competing, all under single testing, it was a reliable judge as to the suitability of the conditions adopted.

Egg Weighing.

Regulations regarding the weighing of eggs were as follows:—

First grade eggs shall weigh:—

From 1st April to 31st May—a minimum weight of 1¾ozs.
From 1st June to 30th June—a minimum weight of 1⅞ozs.
From 1st July to 31st March—a minimum weight of 2ozs.

For the purpose of deciding the leading positions in all sections, only first grade eggs were considered.

The eggs were collected twice daily—at 11 a.m. and 4 p.m., and were weighed immediately following collection.

With the number of birds competing, one man was occupied for full time in the care of the birds, and additional assistance was provided for the collection, weighing, and recording of eggs laid.

The Winter Test.

It is the practice in this particular Competition to conduct a winter test—that period is from 1st April to 31st July, or 122 days. From a stud point of view, the winter test is looked upon as most important, for it is recognised that, for the best returns to be obtained from poultry from an egg-laying point of view, it is essential that a reasonable number of eggs should be produced during the winter period. This is also the highest priced period for eggs in this State. Again, it is almost impossible for a bird that does not lay a reasonable number of eggs up to 31st July to have much chance of recording a good score during her pullet year.

From a stud-breeding aspect it is very questionable whether it is advisable under any condition to consider a hen suitable for the breeding-pen that has not laid well during the winter period.

The following table shows the leading birds in each Section during the winter test:—

TABLE I.

FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	86	39
Willow Bend Stud Poultry Farm	79	478
J. O. Marshall	79	86
B. R. Whittington	79	141
B. Cooke	79	319
Trios—		
B. Cooke	230	319–321
W. R. Williams	199	262–264
W. Restall	189	43–45
Teams—		
T. Duhring	365	181–186
A. H. Matthews	345	7–12
W. R. Williams	327	259–264

Class 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	67	332
Langmaid & Bettison (Minorca)	58	473
A. Heaysman (Cuckoo Leghorn)	55	333
Trios—		
A. Heaysman (Cuckoo Leghorns)	143	331–333
Langmaid & Bettison (Minorcas)	105	471–473
V. F. Gameau (Minorcas)	102	328–330

Class 3.—Black Orpingtons.

Singles—		
F. F. Welford	94	460
H. J. Mills	92	339
A. G. Dawes	80	340
Trios—		
F. F. Welford	223	458–460
B. Cooke	218	385–387
H. J. Mills	212	337–339
Teams—		
H. J. Mills	410	334–339
F. F. Welford	398	373–375 and 458–460
Willow Bend Stud Poultry Farm	339	480–485

Class 4.—Any other Heavy Breed.

Singles—		
Woodbury Poultry Farm (Rhode Island Red)	77	407
A. G. Dawes (Rhode Island Red)	75	396
A. G. Dawes (Rhode Island Red)	74	392
Trios—		
Woodbury Poultry Farm (Rhode Island Red)	192	406–408
A. G. Dawes (Rhode Island Red)	183	391–393
A. G. Dawes (Rhode Island Red)	178	394–396
Teams—		
A. G. Dawes (Rhode Island Red)	353	394–399
A. G. Dawes (Rhode Island Red)	315	388–393

SECTION 2.—DRY MASH.

Class 5.—White Leghorns.

Singles—		
A. O. Dawkins	68	419
A. J. Monkhouse	63	424

SECTION 2.—*Dry Mash*—continued.

Trios—		
A. O. Dawkins	175	418–420
A. J. Monkhouse	169	424–426
Teams—		
A. O. Dawkins	272	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	83	435
G. Frisby Smith	55	433
A. C. Byrne	55	431
Trios—		
G. Frisby Smith	183	433–435
Teams—		
A. C. Byrne	187	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.		•
Milton Smith, Salisbury (White Leghorn) ..	79	452
Robert Swift, Murray Bridge (Black Orpington)	73	456
Max Couche, Thebarton (Rhode Island Red)	69	455
Mervyn Steer, Sturt (White Leghorn)	65	443
Eric Pratt, Abattoirs (White Leghorn)	63	441

The results for the winter test were satisfactory, the leading bird being a Black Orpington pullet owned by Mr. F. F. Welford with a score of 94 first grade eggs.

FEEDING.

There were two methods of feeding—one for wet mash and the other for dry mash, with wheat at midday and night. The wet mash was fed at approximately 7.30 a.m. The dry mash was fed daily, followed by chaffed greenfeed with wheat at mid-day and again at night.

It is rather interesting to note that in all Sections the wet mash birds have done better than the dry mash birds. These results confirm experimental work in feeding tests which have been conducted from time to time at Parafield. The reason is difficult to explain and the only suggestion that can be offered is that the climatic conditions are not conducive at Parafield to the best results from dry-mash feeding.

The mashes were composed of equal parts, by weight, of bran, pollard, and wholemeal, with 1lb. meatmeal, and ½lb. linseed meal per 100 birds. The linseed meal was fed from April 1 to September 30. Chaffed greenfeed varying in percentage according to the period of the year was also added to the mash.

The following table shows the average monthly price of the various foodstuffs fed to the birds, delivered at Parafield Poultry Station:—

TABLE II.

Average Monthly Price of Foodstuffs.

Month.	Wheat, per bush	Bran, per ton.	Pollard, per ton.	Whole-meal, per 60lbs.	Meat, meal, per ton.	Onions, per cwt.	Linseed, Meal, per ton (2,000lbs.)
1934.	*s. d.*	£ *s. d.*	£ *s. d.*	*s. d.*	£ *s. d.*	*s. d.*	£ *s. d.*
April	2 5	4 12 6	4 15 0	2 10½	12 0 0	5 0	9 10 0
May	2 6	5 5 0	5 0 0	2 11	12 0 0	4 6	9 10 0
June	3 0	5 5 0	5 0 0	3 0	13 0 0	4 6	9 10 0
July	3 6	5 5 0	5 0 0	3 9	13 0 0	6 6	9 10 0
August	3 6	5 5 0	5 0 0	3 6	13 0 0	3 6	9 10 0
September	3 6	5 5 0	5 5 0	3 5	13 0 0	3 6	9 10 0
October	2 9	5 5 0	5 5 0	3 5	13 0 0	6 0	9 10 0
November	2 8½	5 0 0	5 2 6	3 2	13 0 0	6 0	9 10 0
December	2 9	5 0 0	5 2 6	3 1	13 0 0	6 0	9 10 0
1935.							
January	2 9	5 0 0	5 2 6	3 1	13 0 0	6 0	10 5 0
February	2 11	5 0 0	5 2 6	3 3	13 0 0	8 0	10 5 0
March	3 0	5 0 0	5 2 6	3 3	13 0 0	5 0	10 5 0
	Average price 35·29d.	Average price 5 1 10½ =12·22d. per bush.	Average price 5 1 5½ =12·17d. per bush.	Average price 38·70d. or 12·9d. per bush. of 20lbs.	Average price 12 16 8 per ton (2,240lbs.)	Average price 5 4½	Average price £9 13 9 per ton (2,000lbs.)

The average cost of feeding per bird was 4s. 8d., which is slightly higher than the 1933-34 test.

PRICES RECEIVED FOR EGGS.

The eggs were disposed of through similar channels as in previous years, the same prices being obtained as is the case with the average commercial egg farmer. The eggs were collected twice daily and marketed practically throughout the year twice a week.

In studying the prices received for eggs, it will be seen that prices were the lowest for the months of December, January, and February, reaching the lowest level in January of 7¼d. per dozen. It is evident that, if the position of the poultry-keeper, who is farming solely for egg production, is to be made secure, attention will have to be given to obtaining better prices during that period, for it is obvious that, with the falling production during these months, coupled with the increased cost of feeding due to the rearing of the young stock, the position of the poultry-keeper during the months of December, January, and February is most difficult.

One pleasing feature of the egg prices is that, during the months of July, August, September, October, and November, when production is at the peak, satisfactory prices have been received for the eggs.

The following table shows the average monetary price received:—

TABLE III.

Average Monthly Prices for Eggs.

Month.	1⅞oz. and over.	1¾oz.
1934.	per doz. s. d.	per doz. s. d.
April	1 3	0 10
May	1 3¼	1 1
June	1 0	0 9
July	0 11¾	0 10
August	0 11¾	0 9¼
September	0 11¾	0 9¼
October	0 11¾	0 10
November	0 10¾	0 9
December	0 8¾	0 7¾
1935.		
January	0 7¼	0 6¾
February	0 8¼	0 7½
March	0 10½	0 8

The average price for the year for eggs of 1⅞ozs. in weight and over was 11.22d. per dozen, as compared with 11.802d. for year 1933-34, while the average price for 1¾oz. eggs was 9.12d. per dozen.

PROFIT OVER COST OF FEEDING.

The profit over cost of feeding can be considered quite satisfactory. The average return per bird was 14s. 4d., and the cost of feeding 4s. 8d., leaving a profit over cost of feeding of 9s. 8d. per bird.

The average number of eggs laid per bird is quite satisfactory. In all, 442 birds completed the test, and the average number of all eggs laid was 191.5, composed of 153.5 first grade eggs and 38 second grade eggs, which is approximately 80 per cent. first grade and 20 per cent. second grade.

In comparing the difference between the wet mash and dry mash average production, it will be seen that the White Leghorns fed on wet mash averaged 194.22 eggs, as against 188.81 eggs fed on dry mash, while the Black Orpingtons fed on wet mash averaged 203 eggs, against 155.77 eggs for birds fed on dry mash.

The highest average production for all breeds was recorded by the Black Orpingtons with the fine average of 203 eggs per bird.

The second highest average was produced by three Barnevelders with the average of 195.66 eggs. The most outstanding feature of the Barnevelder entry was that of 578 eggs laid during the test only nine eggs were under the first grade weights, consequently this trio averaged 192.66 first grade eggs a bird, as compared with the next highest average of 171 first grade eggs.

The average production of the birds entered by the Home Project Workers was also very pleasing, the average being 188.73 eggs a bird; this was an excellent beginning for the Project workers.

The following table shows the number of first grade, second grade, and total average number of eggs laid of all breeds.

TABLE IV.

Breed.	No. Birds that Completed Test.	No. First Grade Eggs Laid.	Average No. First Grade Eggs Laid.	No. Second Grade Eggs Laid.	Average No. of Second Grade Eggs Laid.	Average No. of all Eggs Laid.
Wet Mash Classes.						
White Leghorn	299	44,700	149·49	13,373	44·72	194·22
Minorcas	10	1,191	119·10	74	7·40	126·50
Cuckoo Leghorns.....	3	438	146·00	48	16·00	162·00
Black Orpingtons	61	10,473	171·68	1,915	31·39	203·08
Rhode Island Reds ..	24	3,773	157·20	471	19·62	176·83
Barnevelders	3	578	192·66	9	3·00	195·66
Langshans	3	351	117·00	197	65·66	182·66
Home Project Utility Class	19	3,142	165·36	444	23·36	188·73
Dry Mash Classes.						
White Leghorns......	11	1,891	171·90	186	16·90	188·81
Black Orpingtons	9	1,311	145·66	91	10·11	155·77

DEATH RATE.

During the currency of the test 43 birds died, which was equivalent to just under 9 per cent. With a Competition of 485 birds, this death rate can be considered as just satisfactory, and it is to be hoped that this percentage will not show any further increase. This factor is causing concern in Competitions throughout the world, and every effort should be made by careful selection of the stud stock to breed poultry that can stand up to reasonable production during the first season.

The following are the winning scores in each section:—

FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
S. Hill	274	39
B. R. Whittington	260	141
J. O. Marshall	251	86
Trios—		
B. Cooke	702	319–321
V. E. Williams	645	298–300
A. & H. Gurr	643	196–198
Teams—		
A. G. Dawes	1,114	205–210
Gallagher & Aslin	1,108	307–309 and 464–466
A. Young	1,081	61–66

Class 2.—Any other Light Breed.

	Eggs Laid.	Bird Nos.
Singles—		
A. Heaysman (Cuckoo Leghorn)	205	332
V. F. Gameau (Minorcas)	205	329
Langmaid & Bettison (Minorcas)	186	473
Trios—		
V. F. Gameau (Minorcas)	476	328–330
A. Heaysman (Cuckoo Leghorns)	438	331–333
Langmaid & Bettison (Minorcas)	364	471–473

Class 3.—Black Orpingtons.

Singles—		
H. J. Mills	269	339
F. F. Welford	262	458
F. F. Welford	240	459
H. J. Mills	240	338
Trios—		
F. F. Welford	732	458–460
H. J. Mills	698	337–339
Willow Bend Stud Poultry Farm	620	480–482
Teams—		
F. F. Welford	1,314	373–375 and 458–460
H. J. Mills	1,217	334–339
Willow Bend Stud Poultry Farm	1,132	480–485

Class 4.—Any other Heavy Breed.

Singles—		
E. F. Snow (Rhode Island Red)	229	402
A. G. Dawes (Rhode Island Red)	223	396
A. G. Dawes (Rhode Island Red)	210	395
Trios—		
A. G. Dawes (Rhode Island Red)	586	394–396
K. Pennack (Barnevelders)	578	412–414
W. R. Williams (Rhode Island Red)	520	403–405
Teams—		
A. G. Dawes (Rhode Island Red)	987	394–396
A. G. Dawes (Rhode Island Red)	920	388–393

SECTION 2.—DRY MASH.

Class 5.—White Leghorns.

Singles—		
A. O. Dawkins	226	419
A. J. Monkhouse	207	424
A. J. Monkhouse	202	426
A. V. Dupen	202	423
Trios—		
A. O. Dawknis	604	418–420
A. J. Monkhouse	575	424–426
Teams—		
A. J. Dawkins	1,050	415–420

Class 7.—Black Orpingtons.

Singles—		
G. Frisby Smith	207	433
A. C. Byrne	180	432
A. C. Byrne	166	429
Trios—		
G. Frisby Smith	457	433–435
A. C. Byrne	436	430–432
Teams—		
A. C. Byrne	854	427–432

HOME PROJECT UTILITY SECTION.

Name. School. Breed.	Eggs Laid.	Bird No.
Eric Pratt, Abattoirs (White Leghorn)	247	441
Max Couche, Thebarton (Rhode Island Red)	224	455
F. Martin, Gawler (White Leghorn)	217	447
Stanley Pratt, Abattoirs (White Leghorn)	215	442

TABLE VII.

Showing total number of First Grade and Second Grade Eggs laid by all Competing during the Test.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
	1	217	27	244
A. J. Hill, Sunraysia	2	214	12	226
Poultry Farm,	3	29	199	228
Greensborough,	4	—	1	1
Victoria	5	198	44	242
	6	150	42	192
	7	161	96	257
	8	171	55	226
A. H. Matthews,	9	144	1	145
Bridgewater	10	190	23	213
	11	*	*	*
	12	45	35	80
	13	187	—	187
	14	28	2	30
G. W. T. Symes,	15	205	38	243
Echunga	16	107	100	207
	17	150	—	150
	18	191	1	192
	19	189	—	189
	20	112	19	131
E. B. Gliddon,	21	*	*	*
Yundi	22	*	*	*
	23	81	31	112
	24	83	67	150
	25	173	48	221
	26	112	1	113
T. Cleaver,	27	*	*	*
Bridgewater	28	106	138	244
	29	*	*	*
	30	170	44	214
	31	148	33	181
	32	162	1	163
J. E. Assender,	33	151	5	156
Echunga	34	84	11	95
	35	128	95	223
	36	189	40	229
	37	203	6	209
	38	94	179	273
S. Hill, Bridgewater	39	274	8	282
	40	175	50	225
	41	*	*	*
	42	151	22	173
	43	199	38	237
	44	229	2	231
W. Restall,	45	*	*	*
Echunga	46	159	12	171
	47	146	12	158
	48	163	30	193
	49	180	19	199
	50	219	37	256
C. Guthridge,	51	189	20	209
Yundi	52	32	215	247
	53	73	118	191
	54	124	108	232
	55	187	3	190
	56	28	—	28
S. Lambert,	57	*	*	*
Echunga	58	44	163	207
	59	142	37	179
	60	140	34	174
	61	100	108	208
	62	219	8	227
A. Young,	63	166	—	166
Bridgwater	64	208	9	217
	65	180	1	181
	66	208	10	218
	67	184	1	185
	68	173	—	173
D. J. Foxwell,	69	118	—	118
Echunga	70	165	30	195
	71	127	1	128
	72	45	32	77
	73	157	38	195
	74	210	8	218
J. C. Normandale,	75	192	22	214
Yundi	76	158	82	240
	77	152	102	254
	78	170	86	256
	79	185	4	189
	80	*	*	*
L. W. Sando,	81	151	37	188
Echunga	82	209	44	253
	83	206	1	207
	84	163	26	189
	85	216	4	220
	86	251	2	253
J. O. Marshall,	87	53	164	217
Yundi	88	*	*	*
	89	186	3	189
	90	177	1	178
	91	102	36	138
	92	190	45	235
Murray Powell,	93	199	55	254
Jupiter Creek	94	*	*	*
	95	215	4	219
	96	69	47	116
	97	187	77	257
	98	163	7	170
S. Bridge, Yundi	99	159	20	179
	100	139	—	139
	101	*	*	*
	102	201	25	226
	103	97	29	126
	104	149	23	172
C. T. Rodger,	105	175	31	206
Echunga	106	194	13	207
	107	197	4	201
	108	*	*	*
	109	50	193	243
	110	35	236	271
R. H. Smith, Yundi	111	231	6	237
	112	31	205	236
	113	146	110	256
	114	77	195	272
	115	66	81	147
Willow Bend Stud	116	111	68	179
Poultry Farm,	117	178	11	189
North Walkerville	118	—	2	2
	119	79	121	200
	120	162	41	203
	121	28	25	53
	122	125	1	126
C. MacDonald,	123	202	—	202
Echunga	124	182	2	184
	125	156	48	204
	126	110	1	111
	127	228	5	233
	128	132	2	134
T. R. Smart,	129	*	*	*
Yundi	130	124	64	188
	131	*	*	*
	132	162	9	171
	133	80	142	222
Raymoor Poultry	184	172	23	195
Farm, William	135	181	7	188
Street, Kilkenny	136	162	18	180
	137	137	98	235
	138	*	*	*
	139	104	81	185
	140	162	23	185
B. R. Whittington,	141	260	11	271
Yundi	142	144	84	228
	143	99	148	242
	144	193	16	209

* Dead.

TABLE VII.—*continued.*

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
W. A. Hazeal, 11, Rosetta Street, Rosewater	145	7	128	135
	146	242	3	245
	147	159	72	231
	148	*	*	*
	149	164	3	167
	150	*	*	*
H. F. Muirson, Yundi	151	61	167	228
	152	106	161	267
	153	82	7	89
	154	73	159	232
	155	133	22	155
	156	148	52	200
K. Pennack, Pooraka	157	3	201	204
	158	165	82	247
	159	131	98	229
	160	210	49	259
	161	99	161	260
	162	191	8	199
C. A. L. Sandstrom, Yundi	163	117	—	117
	164	164	2	166
	165	185	15	200
	166	223	1	224
	167	160	18	178
	168	62	154	216
G. A. Bielby, Pooraka	169	78	155	233
	170	105	93	198
	171	97	133	230
	172	181	61	242
	173	*	*	*
	174	*	*	*
W. M. Field, Yundi	175	160	—	160
	176	153	29	182
	177	182	11	193
	178	73	135	208
	179	153	2	155
	180	153	2	155
T. Duhring, Mallala	181	221	—	221
	182	237	2	239
	183	172	18	190
	184	189	52	241
	185	122	101	223
	186	103	10	113
W. R. Hedger, Yundi	187	192	3	195
	188	*	*	*
	189	84	101	185
	190	109	145	254
	191	228	4	232
	192	—	—	—
A. & H. Gurr, Bradbury	193	190	18	208
	194	210	16	226
	195	*	*	*
	196	217	9	226
	197	210	2	212
	198	216	—	216
J. V. McGinnis, Yundi	199	206	9	215
	200	91	140	231
	201	154	13	167
	202	145	92	237
	203	176	2	178
	204	22	176	198
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	221	7	228
	206	179	1	180
	207	219	—	219
	208	137	110	247
	209	155	6	161
	210	203	3	206
W. O. Jones, Yundi	211	12	257	269
	212	135	149	284
	213	227	10	237
	214	118	84	202
	215	187	5	192
	216	76	45	121
Langmaid and Bettison, Parafield, Salisbury	217	*	*	*
	218	145	42	187
	219	73	98	171
	220	140	1	141
	221	154	5	159
	222	167	28	195
A. Jarvis, Yundi	223	79	156	235
	224	155	102	257
	225	94	147	241
	226	158	26	184
	227	146	79	225
	228	211	18	229
S. Eyles, Clarendon	229	79	63	142
	230	*	*	*
	231	170	1	171
	232	153	3	156
	233	223	6	229
	234	168	—	168
Woodbury Poultry Farm, Stirling East	235	128	112	240
	236	17	22	39
	237	194	4	198
	238	*	*	*
	239	66	—	66
	240	*	*	*
V. F. Gameau, Findon Road, Woodville	241	85	168	253
	242	6	3	9
	243	139	—	139
	244	*	*	*
	245	96	3	99
	246	138	12	150
Geo. Lomax, Yundi	247	150	—	150
	248	39	199	238
	249	165	54	219
	250	*	*	*
	251	*	*	*
	252	69	22	91
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	180	17	197
	254	232	3	235
	255	71	185	256
	256	21	250	271
	257	14	228	242
	258	29	100	129
W. R. Williams, 28, Avenue Road, Frewville	259	246	4	250
	260	93	163	256
	261	*	*	*
	262	158	93	251
	263	226	4	230
	264	231	28	259
R. W. McAlister, Yundi	265	95	179	274
	266	171	64	190
	267	192	31	223
	268	117	74	191
	269	214	1	215
	270	144	96	240
G. W. Sykes, Yundi	271	73	142	215
	272	*	*	*
	273	139	—	139
	274	210	3	213
	275	195	—	195
	276	152	66	218
A. P. Urlwin, Balaklava	277	228	5	233
	278	189	22	211
	279	204	20	224
A. V. Dupen, Melton Street, Glenelg	280	211	—	211
	281	233	5	238
	282	135	8	143
F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	105	—	105
	284	219	—	219
	285	169	6	175
Thomas & Elson, Clifton Street, Hawthorn	286	165	14	179
	287	95	25	120
	288	166	50	216

* Dead.

TABLE VII.—*continued.*

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
J. H. Dowling, Glossop, River Murray	289	134	98	232
	290	204	3	207
	291	201	2	203
E. Pape, Wynarka	292	*	*	*
	293	27	88	115
	294	163	3	166
L. S. Ekers, Mount Jagged Farm, Mount Compass	295	182	1	183
	296	148	—	148
	297	185	—	185
V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	214	2	216
	299	207	29	236
	300	224	—	224
L. R. Badcock, 77, Findon Road, Woodville	301	120	—	120
	302	99	14	113
	303	139	—	139
W. H. A. Hodgson, Commercial Road, Salisbury	304	131	21	152
	305	201	4	205
	306	229	—	229
Gallagher & Aslin, Pooraka	307	193	3	196
	308	195	7	202
	309	170	—	170
R. C. Crittenden, William Street, Kilkenny North	310	218	8	226
	311	182	1	183
	312	81	4	85
C. H. Lines, junr., Gladstone	313	167	1	168
	314	206	50	256
	315	211	15	226
A. J. Monkhouse, Woodside	316	203	22	225
	317	117	96	213
	318	72	173	245
B. Cooke, Kanmantoo	319	224	28	252
	320	250	2	252
	321	228	—	228

Class 2—Any Other Light Breeds.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322	82	—	82
	323	5	1	6
	324	103	—	103
G. Frisby Smith, Fulham (Minorcas)	325	*	*	*
	326	*	*	*
	327	161	4	165
V. F. Gameau, Findon Road, Woodville (Minorcas)	328	111	—	111
	329	205	27	232
	330	160	20	180
A. Heaysman, Government Road, Eden Hills (Cuckoo Leghorns)	331	83	3	86
	332	205	2	207
	333	150	48	198

Class No. 3—Black Orpingtons.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
H. J. Mills, 108, Edward Street, Edwardstown	334	214	6	220
	335	95	—	95
	336	210	38	248
	337	189	1	190
	338	240	1	241
	339	269	3	272
A. G. Dawes, Portrush Road, Glenunga Gardens	340	216	3	219
	341	159	—	159
	342	219	2	221
	343	179	1	180
	344	152	87	239
	345	173	7	180

Class No. 3—Black Orpingtons—continued.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
Willow Bend Stud Poultry Farm, North Walkerville	346	210	16	226
	347	203	12	215
	348	182	7	189
	349	191	48	239
	350	92	156	248
	351	118	53	171
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352	164	2	166
	353	157	40	197
	354	173	1	174
	355	117	38	155
	356	219	11	230
	357	174	57	231
A. C. Byrne, 114, Rose Terrace, Wayville West	358	140	5	145
	359	136	26	162
	360	123	9	132
	361	160	67	227
	362	214	61	275
	363	133	28	161
W. R. Williams, 28, Avenue Road, Frewville	364	38	226	264
	365	146	93	239
	366	132	116	248
C. H. Lines, junr., Gladstone	367	184	12	196
	368	126	5	131
	369	*	*	*
J. H. Dowling, Glossop, River Murray	370	108	32	140
	371	148	19	167
	372	*	*	*
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373	190	32	222
	374	186	25	211
	375	206	30	236
Mrs. M. Specht, Holder Avenue, Richmond	376	208	42	250
	377	187	30	217
	378	178	7	185
W. Rentoul Christie, Claremont Avenue, Mitcham	379	130	1	131
	380	191	1	192
	381	97	—	97
G. Frisby Smith, Fulham House, Fulham	382	156	13	169
	383	35	178	213
	384	124	1	125
B. Cooke, Kanmantoo	385	227	19	246
	386	198	30	228
	387	193	55	248

Class No. 4—Any Other Heavy Breed.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds)	388	152	42	194
	389	179	57	236
	390	105	74	179
	391	170	4	174
	392	119	26	145
	393	195	1	196
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds)	394	153	2	155
	395	210	—	210
	396	223	6	229
	397	176	1	177
	398	55	13	68
	399	170	77	247
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds)	400	83	105	188
	401	133	—	133
	402	229	2	231
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds)	403	149	—	149
	404	165	—	165
	405	206	—	206
Woodbury Poultry Farm, Stirling East (Rhode Island Reds)	406	71	19	90
	407	180	18	198
	408	178	23	201

* Dead.

TABLE VII.—*continued.*

Class No. 4—Any Other Heavy Breed—contd.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
V. F. Gameau, Findon Road, Woodville (Rhode Island Reds)	409	170	—	170
	410	149	—	149
	411	153	1	154
K. Pennack, Pooraka (Barnevelders)	412	195	9	204
	413	179	—	179
	414	204	—	204

SECTION 2—DRY MASH.

Class No. 5—White Leghorns.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
A. O. Dawkins, Gawler	415	182	23	205
	416	180	—	180
	417	84	63	147
	418	195	16	211
	419	226	4	230
	420	183	23	206
A. V. Dupen, Melton Street, Glenelg	421	64	—	64
	422	*	*	*
	423	202	—	202
A. J. Monkhouse, Woodside	424	207	45	252
	425	166	9	175
	426	202	3	205

Class No. 7—Black Orpingtons.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
A. C. Byrne, 114, Rose Terrace, Wayville West	427	125	—	125
	428	127	—	127
	429	166	3	169
	430	92	8	100
	431	164	5	169
	432	180	1	181
G. Frisby Smith, Fulham House, Fulham	433	207	5	212
	434	130	65	195
	435	120	4	124

WET MASH.

Home Project Utility Section.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
John Plummer, Virginia School	436	192	14	206
Dudley Harper, Murray Bridge School	437	101	1	102
Jack Beauchamp, Murray Bridge, School	438	155	16	171
Jack Beauchamp, Murray Bridge, School	439	115	79	194
George Beilby, Abattoirs School	440	*	*	*
Eric Pratt, Abattoirs School	441	247	3	250
Stanley Pratt, Abattoirs School	442	215	5	220
Mervyn Steer, Sturt School	443	190	43	233
Donald Welford, Westbourne Park School	444	155	—	155
E. Zbierski, Gawler School	445	*	*	*
J. McInerney Gawler School	446	85	63	148
F. Martin, Gawler School	447	217	1	218
Darcey Coleman, Mallala School	448	188	13	201
Kevin Angus, Mallala School	449	79	165	244

Home Project Utility Section—continued.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
Alwin Scott, Wellington Road School	450	185	9	194
Jack Dietman, Wellington Road School	451	125	15	140
Milton Smith, Salisbury School	452	189	11	200
Owen Robinson, Ascot Park School	453	175	—	175
Paul Mundy, Urrbrae High School	454	125	6	131
Max Couche, Thebarton School	455	224	—	224
Robert Swift, Murray Bridge School	456	*	*	*
Bruce Dooland, Thebarton Central School	457	*	*	*
Ian Slee, Two Wells School	470	180	—	180

All birds in this section are White Leghorns with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458	262	4	266
	459	240	4	244
	460	230	—	230

The above birds are Black Orpingtons, together with Nos. 373-375, will constitute a team in Class No. 3.

Class No. 4.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
G. W. Lindsay, Torrens Road, Kilkenny (Langshans)	461	48	139	187
	462	104	43	147
	463	199	15	214

Class No. 1.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
Gallagher & Aslin, Pooraka	464	169	4	173
	465	207	3	210
	466	174	2	176

The above birds are White Leghorns and, together with Nos. 307 and 309, will constitute a team in this class.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
W. C. Slape, Magill	467	141	3	144
	468	183	5	188
	469	*	*	*

Class No. 2.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471	26	12	38
	472	152	6	158
	473	186	4	190

Class No. 1.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
Willow Bend Stud Poultry Farm, North Walkerville	474	234	1	235
	475	7	—	7
	476	221	7	228
	477	*	*	*
	478	239	—	239
	479	233	12	245

SECTION 1.

Class No. 3.

Competitor.	Bird No.	1st Grade.	2nd Grade.	Total.
Willow Bend Stud Poultry Farm North Walkerville	480	186	1	187
	481	196	24	220
	482	238	3	241
	483	119	98	217
	484	177	26	203
	485	216	2	218

* Dead.

STANDARD CERTIFICATES.

For the first time the Department of Agriculture has instituted a system of standard certificates. It is realised that birds that have completed the twelve months' test and laid a reasonable number of first grade eggs are entitled to some recognition. The standard has been fixed as follows:—

For light breeds at 200 first grade eggs.

For heavy breeds at 180 first grade eggs.

Of the 442 birds that completed the test, 119 obtained the standard certificate. This is equivalent to 27 per cent. of all birds that competed.

It is to be hoped that the system of standard certificates will eventually lead to the establishment of a stud breeders' register, the object of which would be the gradual improvement of the poultry flocks of the State.

The following were the winning birds in each Section:—

The highest score in the Competition was recorded by a White Leghorn owned by Mr. S. Hill, of Bridgewater, with the good score of 274 first grade eggs.

In the Black Orpingtons Mr. H. J. Mills again won with the score of 269 first grade eggs.

The Home Project Section was won by Master Eric Pratt, with the very creditable score of 247 first grade eggs; the bird was a White Leghorn. Master Max Couche was second in this Section with a score of 224 first grade eggs recorded by a Rhode Island Red.

A GENERAL SUMMARY OF THE RESULTS.

Number of birds that completed test		442
Average number of all eggs laid		191.5
Averages various breeds competing:—		
Birds fed on wet mash—	**Birds.**	**Eggs.**
Black Orpingtons	61	203.08
Barnevelders	3	195.66
White Leghorns	299	194.22
White Leghorns, Home Project Utility Section	19	188.73
Langshans	3	182.66
Rhode Island Reds	24	176.83
Cuckoo Leghorns	3	162
Minorcas	10	126.5
Birds fed on dry mash—		
White Leghorns	11	188.8
Black Orpingtons	9	155.77

Average cost of food per bird, 4s. 8d.

Average return per bird, 14s. 4d.

Average gross return over cost of feeding, 9s. 8d.

TROPHIES.

The Red Comb Egg Association Incorporated has been instrumental in securing a valuable set of trophies for winners of the various sections from the South Australian Farmers' Co-operative Union, Limited, Messrs. Betteridge & Hall, B. J. Walters Limited, D. Lanyon & Sons, F. H. Faulding & Co. Limited, W. H. Burford & Sons, Lever Bros., W. D. & H. O. Wills, Wm. Jackett & Son, Meggitts Limited, L. E. Saunders, A. K. Andrewartha, C. H. Glatz, J. E. Neldner, Adelaide Chemical & Fertilizer Co. Limited, Wingfield Casing Co. Pty. Limited, Australian Veterinary Laboratories, and Bridgewater Milling Co., whose donations have been greatly appreciated.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 26th May, 1935.	
B. Cooke, Kanmantoo.	1	16	
	2	17	
	3	20	53
	4	18	
	5	17	
	6	26	61
			114
	7	—	
	8	—	
	9	—	—
	10	—	
	11	—	
	12	—	—
			—
A. H. Matthews, Bridgewater	13	18	
	14	—	
	15	31	49
	16	24	
	17	20	
	18	12	56
			105
H. F. Muirson, Yundi.	19	4	
	20	11	
	21	7	22
	22	13	
	23	22	
	24	30	65
			87
E. McKee, 5, Rose Street, Carrondown.	25	28	
	26	37	
	27	35	100
	28	37	
	29	35	
	30	28	100
			200
H. C. Stacy, Meadows.	31	—	
	32	30	
	33	32	62
	34	4	
	35	21	
	36	35	60
			122
T. Cleaver, Bridgewater.	37	—	
	38	11	
	39	23	34
	40	20	
	41	4	
	42	15	39
			73
C. Sandstrom, Yundi.	43	2	
	44	—	
	45	23	25
	46	14	
	47	4	
	48	29	47
			72
A. J. Monkhouse, Woodside.	49	12	
	50	27	
	51	20	59
	52	31	
	53	14	
	54	20	65
			124
J. F. Smith, Meadows.	55	19	
	56	32	
	57	7	58
	58	13	
	59	2	
	60	22	37
			95
A. Young, Bridgewater.	61	32	
	62	18	
	63	23	73
	64	—	
	65	25	
	66	14	39
			112
R. W. McAlister, Yundi.	67	18	
	68	7	
	69	21	46
	70	14	
	71	4	
	72	24	42
			88
T. Duhring, Mallala.	73	33	
	74	33	
	75	28	94
	76	12	
	77	33	
	78	29	74
			168
R. J. Underdown, Meadows.	79	22	
	80	17	
	81	27	66
	82	11	
	83	33	
	84	29	73
			139
S. Hill, Bridgewater.	85	15	
	86	20	
	87	24	59
	88	25	
	89	32	
	90	16	73
			132
W. R. Hedger, Yundi.	91	—	
	92	7	
	93	6	13
	94	16	
	95	1	
	96	5	22
			35

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 26th May, 1935.	
	97	4	
	98	9	
Langmaid & Bettison,	99	—	13
Salisbury.	100	16	—
	101	1	
	102	—	17
			30
	103	33	
	104	21	
E. Portlock,	105	28	82
Meadows.	106	17	
	107	20	
	108	33	70
			152
	109	31	
	110	6	
Murray Powell,	111	28	65
Jupiter Creek.	112	12	
	113	38	
	114	24	74
			139
	115	27	
	116	22	
G. W. Bignell,	117	6	55
Meadows.	118	8	
	119	15	
	120	20	43
			98
	121	26	
	122	11	
	123	—	37
W. M. Field,	124	3	
Yundi.	125	12	
	126	35	40
			77
	127	23	
	128	26	
	129	36	85
C. R. Wharton,	130	27	
Meadows.	131	19	
	132	30	76
			161
	133	19	
	134	28	
	135	27	74
H. H. Hefford,	136	7	
Murray Bridge.	137	33	
	138	23	63
			137
	139	18	
	140	1	
	141	11	30
F. W. Gage,	142	20	
Meadows.	143	11	
	144	18	49
			79
	145	32	
	146	18	
	147	dead	50
W. H. L. Norman,	148	23	
Echunga.	149	30	
	150	8	61
			111
	151	30	
	152	1	
	153	9	40
B. R. Whittington,	154	18	
Yundi.	155	27	
	156	6	51
			91
	157	27	
	158	24	
	159	23	74
B. C. Sanders,	160	26	
Meadows.	161	—	
	162	9	35
			109
	163	—	
	164	13	
	165	19	32
H. H. Gallagher,	166	1	
Pooraka.	167	5	
	168	17	23
			55
	169	31	
	170	—	
	171	18	49
W. Sickert,	172	17	
Meadows.	173	28	
	174	28	73
			122
	175	3	
	176	—	
	177	21	24
W. Restall,	178	26	
Echunga.	179	17	
	180	21	64
			88
	181	27	
	182	13	
A. G. Dawes,	183	14	54
230, Portrush Road,	184	—	
Glenunga.	185	22	
	186	27	49
			103
	187	9	
	188	5	
	189	12	26
G. W. Sykes,	190	4	
Yundi.	191	9	
	192	25	38
			64
	193	23	
	194	28	
	195	22	73
R. Bartley,	196	14	
Meadows.	197	22	
	198	24	60
			133
	199	8	
	200	3	
A. & H. Gurr,	201	17	28
Mindaroo Poultry Farm,	202	28	
Bradbury.	203	1	
	204	10	39
			67

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 26th May, 1935.	
J. J. Devlin, Meadows.	205	30	
	206	25	
	207	31	86
	208	21	
	209	3	
	210	31	55
			141
D. J. Foxwell, Echunga.	211	28	
	212	8	
	213	14	50
	214	4	
	215	17	
	216	3	24
			74
F. J. Buck, Meadows.	217	17	
	218	4	
	219	39	60
	220	16	
	221	18	
	222	2	36
			96
J. A. Grist, Yundi.	223	2	
	224	—	
	225	10	12
	226	2	
	227	dead	
	228	13	15
			27
L. A. King, Meadows.	229	29	
	230	25	
	231	12	66
	232	—	
	233	27	
	234	3	30
			96
E. W. Sando, Echunga.	235	22	
	236	22	
	237	14	58
	238	18	
	239	24	
	240	1	43
			101
E. W. Young, Meadows.	241	26	
	242	25	
	243	17	68
	244	19	
	245	—	19
	246	—	
			87
A. Jarvis, Yundi.	247	7	
	248	6	
	249	6	19
	250	8	
	251	10	
	252	30	48
			67
	253	—	
	254	—	
	255	—	—
	256	—	
	257	—	
	258	—	—
S. Bridge, Yundi.	259	20	
	260	21	
	261	14	55
	262	8	
	263	18	
	264	—	26
			81
H. G. Egarr, Meadows.	265	28	
	266	28	
	267	13	69
	268	16	
	269	23	
	270	6	45
			114
R. H. Smith, Yundi.	271	23	
	272	11	
	273	6	40
	274	29	
	275	5	
	276	14	48
			88
J. M. Lawson, Meadows.	277	22	
	278	21	
	279	33	76
	280	22	
	281	26	
	282	25	73
			149
J. O. Marshall, Yundi.	283	6	
	284	17	
	285	18	41
	286	28	
	287	24	
	288	14	66
			107
G. Joyce, Meadows.	289	12	
	290	30	
	291	18	66
	292	31	
	293	26	
	294	31	88
			154
J. A. Bradtke, Yongala.	295	2	
	296	9	
	297	18	
		29	
W. H. A. Hodgson, Salisbury.	298	33	
	299	29	
	300	29	
		91	
A. W. McDonald, Gawler.	301	22	
	302	15	
	303	10	
		47	
J. H. Dowling, Glossop.	304	25	
	305	29	
	306	1	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 26th May, 1935.	
A. P. Urlwin, Balaklava.	307	20	
	308	18	
	309	7	
		45	
L. S. Ekers, Mount Compass.	310	16	
	311	9	
	312	26	
		51	
V. E. Williams, Semaphore Park.	313	24	
	314	24	
	315	18	
		66	
F. P. Munzberg, Tanunda.	316	23	
	317	24	
	318	18	
		65	
Total Class 1		5 313	
Class 2—Any Other Light Breed.			
Langmaid & Bettison, Salisbury. (Black Minorcas.)	319	18	
	320	23	
	321	26	
		67	
A. Heaysman, Government Road, Eden Hills. (Cuckoo Leghorns.)	322	18	
	323	34	
	324	20	
		72	
Total Class No. 2.		139	
Class No. 3—Black Orpingtons.			
A. G. Dawes, 230, Portrush Road, Glenunga.	325	14	
	326	9	
	327	44	67
	328	29	
	329	18	
	330	7	54
			121
H. J. Mills, 108, Edward Street, Edwardstown.	331	11	
	332	13	
	333	1	25
	334	3	
	335	19	
	336	7	29
			54
K. Pennack, Pooraka.	337	25	
	338	15	
	339	9	49
	340	19	
	341	31	
	342	—	50
			99
H. H. Gallagher, Pooraka.	343	12	
	344	3	
	345	17	32
	346	6	
	347	2	
	348	—	8
			40

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 26th May, 1935.	
B. Cooke, Kanmantoo.	349	10	
	350	2	
	351	—	
		12	
H. H. Hefford, Murray Bridge.	352	25	
	353	—	
	354	6	
		31	
J. H. Dowling, Glossop.	355	1	
	356	3	
	357	19	
		23	
L. S. Ekers, Mount Compass.	358	6	
	359	3	
	360	5	
		14	
A. G. Dawes, 230, Portrush Road, Glenunga.	452	1	
	453	—	
	454	—	1
	455	—	
	456	9	
	457	—	9
			10
A. P. Urlwin, Balaklava.	465	10	
	466	11	
	467	8	
		29	
Total Class No. 3		433	
Class No. 4.—Any Other Heavy Breed.			
H. J. Mills, 108, Edward Street, Edwardstown. (Rhode Island Reds.)	361	1	
	362	1	
	363	1	3
	364	39	
	365	21	
	366	6	66
			69
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	367	3	
	368	16	
	369	—	19
	370	13	
	371	10	
	372	—	23
			42
F. F. Welford, 1, Ludgate Circus, Colonel Light Gardens. (Rhode Island Reds.)	373	3	
	374	20	
	375	12	35
	376	1	
	377	1	
	378	—	2
			37
V. F. Gameau, Findon Road, Woodville. (Rhode Island Reds.)	379	4	
	380	26	
	381	29	59
	382	15	
	383	7	
	384	11	33
			92

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.	
K. Pennack, Pooraka. (Barnevelders.)	385	1	
	386	10	
	387	13	24
	388	11	
	389	11	
	390	34	56
			80
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	458	2	
	459	5	
	460	15	22
	461	8	
	462	13	
	463	4	25
			47
Total Class No. 4			367

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Competitor.	Bird No.	Eggs	
G. R. Cowell, Balhannah.	391	20	
	392	9	
	393	7	36
	394	1	
	395	10	
	396	19	30
			66
A. J. Monkhouse, Woodside.	397	24	
	398	14	
	399	14	52
	400	8	
	401	17	
	402	18	43
			95
G. R. Cowell, Balhannah.	403	19	
	404	8	
	405	9	36
	406	11	
	407	7	
	408	7	25
			61
Total Class No. 5			222

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	Eggs
W. R. Christie, Upper Mitcham.	409	8
	410	—
	411	7
		8
Total Class No. 7		15

Class No. 8.—Any Other Heavy Breed.

Competitor.	Bird No.	Eggs
W. R. Christie, Upper Mitcham. (Rhode Island Reds.)	412	7
	413	10
	414	17
		34
Total Class No. 8		34

SECTION 3.—WET MASH.

Home Project Utility Section.—Any Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.
Peter Western, Ascot Park School. (White Leghorn.)	415	32
Peter Western, Ascot Park School. (White Leghorn.)	416	31
William Sando, Echunga School. (White Leghorn.)	417	16
Douglas Marshall, Yundi School. (White Leghorn.)	418	24
Norman Page, Murray Bridge School. (White Leghorn.)	419	13
Kelvyn & Brian Nicholls, Finniss School. (White Leghorn.)	420	20
Dean Colwell, Grange School (White Leghorn.)	421	11
Warren Hannaford, Paracombe School. (White Leghorn.)	422	22
W. Horne, Woodville School. (White Leghorn.)	423	23
Owen Robinson, Ascot Park School. (White Leghorn.)	424	27
June Chapman, Woodchester School. (White Leghorn.)	425	4
Rosa Hunt, Morphett Vale School. (White Leghorn.)	426	8
Jack O'Sullivan, Morphett Vale School. (White Leghorn.)	427	23
Peter Taylor, Morphett Vale School. (White Leghorn.)	428	3
James Taylor, Morphett Vale School. (White Leghorn.)	429	18
William Gregory, Victor Harbour School. (White Leghorn.)	430	6
Ian Bruce, McLaren Flat School. (White Leghorn.)	431	5
Clifford Burford, Smithfield School. (White Leghorn.)	432	1
Tom Callaghan, Smithfield School. (White Leghorn.)	433	—
Eric Pratt, Abattoirs School. (White Leghorn.)	434	30
Stanley Pratt, Abattoirs School. (White Leghorn.)	435	27
Alan Yelland, Cunliffe School. (Minorca.)	436	7
Gordon Gallasch, Gilles Plains School. (White Leghorn.)	437	16

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 28th April, 1935.
Clarence King, Tarlee School. (White Leghorn.)	438	—
Olive Pitman, Gilles Plains School. (Black Orpington.)	439	37
Donald Heading, Sturt School. (Black Orpington.)	440	22
Clive Steer, Sturt School. (Black Orpington.)	441	7
Herbert Oliver, McLaren Vale School. (Black Orpington.)	442	33
Lyol Stone, Morphett Vale School. (Black Orpington.)	443	30
Ray Candy. Noarlunga School. (Black Orpington.)	444	1
Malcolm Booth, Bridgewater School. (Black Orpington.)	445	25
Murray Heneker and Frank Short, Hamley Bridge School. (Black Orpington.)	446	16
Peter Boucaut, Seaton Park School. (Rhode Island Red.)	447	3
Peter Preece, Gilles Plains School. (Rhode Island Red.)	448	17
Cliff Crosser, Wellington Road School. (White Leghorn.)	449	30
John Keldoulis, Orroroo School. (Black Orpington.)	450	12
Bruce Dooland, Thebarton School. (Black Orpington.)	451	—
Alan Yelland, Cunliffe School. (Rhode Island Red.)	464	2
Total		602

FEEDING TESTS AT PARAFIELD POULTRY STATION

[New Series of Tests by C. F. ANDERSON, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April to 30th April.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal; 2ozs. wheat per day.
2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.
3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.
4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.
5. Commencing with a crushed barley and crushed wheat mash, greenfeed, meatmeal and then the feeding to be changed according to the season of the year.

	No. Eggs Laid 1st April, 1935, to 30th April, 1935.	No. Eggs Laid Month of May, 1935.	Total Eggs Laid 1st April, 1935, to 31st May, 1935.
No. 1 Test	457	367	824
No. 2 Test	458	373	831
No. 3 Test	418	324	742
No. 4 Test	350	237	587
No. 5 Test	317	300	617

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED 26TH *MAY,* 1935.—

FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—*White Leghorns.*

Singles—

	Eggs Laid.	Bird No
M. Powell	38	113
F. J. Buck	39	219
E. McKee	37	26
E. McKee	37	28

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1935.

ECGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, 30/- per 100.

DAY OLD CHICKENS.—15s. per dozen; £3/10/- in lots of 100.

BLACK ORPINGTONS.

EGGS.—10/- per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—17/6 per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, 30/- per 100.

DAY OLD CHICKENS.—15s. per dozen; £3/10/- in lots of 100.

Free on Rail, Salisbury.

DELIVERY.—CHICKS—July to September.
EGGS—July to September.

Intending breeders should realise the importance of establishing their flocks with only the very best of stock, also pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

Trios—		
E. McKee	100	25- 27
E. McKee	100	28- 30
T. Duhring	94	73- 75
Teams—		
E. McKee	200	25- 30
T. Duhring	168	73- 78
C. R. Wharton	161	127-132

Class No. 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	34	323

Class No. 3.—Black Orpingtons.

Singles—		
A. G. Dawes	44	327
K. Pennack	31	341
Trios—		
A. G. Dawes	67	325-327
A. G. Dawes	54	328-330
Teams—		
A. G. Dawes	121	325-330
K. Pennack	99	337-342
H. J. Mills	54	331-336

Class 4.—Any other Heavy Breed.

Singles—		
H. J. Mills (Rhode Island Red)	39	364
K. Pennack (Barnevelder)	34	390
Trios—		
H. J. Mills (Rhode Island Red)	66	364-366
V. F. Gameau (Rhode Island Red)	59	379-381
Teams—		
V. F. Gameau (Rhode Island Reds)	92	379-384
K. Pennack (Barnevelders)	80	385-390

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Singles—		
A. J. Monkhouse	24	397
G. R. Cowell	19	396
G. R. Cowell	19	403
Trios—		
A. J. Monkhouse	52	397-399
A. J. Monkhouse	43	400-402
Teams—		
A. J. Monkhouse	95	397-402
G. R. Cowell	66	391-396

Class No. 7.—Black Orpingtons.

Singles—		
W. R. Christie	8	409

Class No. 8.—And other Heavy Breed.

W. R. Christie	17	414

SECTION 3.—WET MASH.

Singles—		
Olive Pitman, Gilles Plains School (Black Orpington)	37	439
Herbert Oliver, McLaren Vale (Black Orpington)	33	442
Peter Western, Ascot Park School (White Leghorn)	32	415
Peter Western, Ascot Park School (White Leghorn)	31	416
Eric Pratt, Abattoirs School (White Leghorn)	30	434
Cliff Crosser, Wellington Road (White Leghorn)	30	449
Lyol Stone, Morphett Vale (Black Orpington)	30	443

THE STATE EXPERIMENT ORCHARD, COROMANDEL VALLEY, NEAR BLACKWOOD, SOUTH AUSTRALIA.

[By GEO. QUINN, Chief Horticultural Instructor.]

(*Continued from page* 1262.)

ROOTSTOCKS—FOR PEAR TREES.

Under the widely differing conditions of soils and climate occurring in the various orchard districts of South Australia, the pear may be fairly claimed to have proved itself the least fastidious of all of our orchard trees. Providing the necessary moisture be available to the roots, and what is accepted as ordinarily good tillage be given to the soil, this tree thrives well in the open hot country possessing a limited depth of loam above the clay or marly subsoil. In the deep rich valley soils of the wetter and colder districts it proves equally at home. Its power to resist excessive moisture in the soil during fairly long periods has led to it being utilised to plant the lower lands in the orchards where perhaps the quince tree only could endure a longer period of waterlogging.

It has been largely due to the great vigour of vegetation displayed by most varieties of the pear, when grown under such conditions, that our orchardists, when planting certain pears freely a couple of decades ago, frequently desired that their trees should be worked on rootstocks less inclined to stimulate and maintain rank growth than that found in the seedling pear. That was the only reason underlying the demand which arose in this State at that time for pear trees grafted on quince rootstocks.

In older countries of Europe and to a lesser degree in America, the use of the quince rootstock as a means of reducing the vigour of growth, and incidentally inducing an earlier arrival at the stage of fruitfulness in the variety of pear worked upon it, has been accepted as a standard practice amongst horticulturists for probably centuries past. In Europe the subject has been studied with meticulous care, and pomological literature in describing the characteristics of varieties of pears rarely omit to mention their respective adaptabilities to the dual stocks. It has been discovered by trial and failure which of the favoured varieties are directly compatible with the quince, and which require to have an intermediate stem piece of a more compatible variety grafted between them and the quince rootstocks.

When these trials with the two generally accepted rootstocks for pears, *viz.*, pear seedling and quince, were initiated in 1909, the four varieties selected and propagated for testing thereon were listed amongst those suited for the overseas export trade in this fruit which was then beginning to attract the attention of our orchardists. Amongst these varieties only the Glou Morceau was generally recognised as having displayed sufficient affinity for the quince rootstock to warrant it being propagated directly upon that stock.

As there was at that time a great surplus of quince trees grown in this State, and growers showed a disposition to try to work some of them over to export and canning varieties of pears, the writer deemed it desirable to test the degree of compatibility with the quince stock displayed by sorts other than the Glou Morceau variety. This variety at that time was considered our most desirable pear for overseas export and local cold storage purposes. Incidentally, it may be mentioned also that owing to the great improvements made during recent years in the handling, packing, and cold storing methods applied to fruit in transit overseas, all of these four

varieties of pears have now been superseded in the overseas and local markets, either by new varieties or old varieties formerly found incapable of standing up to the less effective conditions of transport in vogue a quarter of a century ago.

The rootstocks used in these trials were procured from the then leading local fruit tree nurseryman in South Australia. The pear seedlings had been raised by him from imported French seeds, and the quince rootlings had been propagated by him from plants of the Angers variety of quince, originally imported from European sources.

The seedling pear stocks which were carefully selected for evenness of vigour and good healthy condition generally, were budded in 1909 in the nursery of the Blackwood orchard. The quince rootlings were similarly worked during the same summer. The nurseryman in question utilised this stock to meet the demand for Glou Morceau trees worked upon the quince.

[*E. W. Pritchard, photo.*]

Beurre Easter on Pear Seedling Stock.

This so-called Angers variety of quince is stated to be barren, vigorous-growing and possessed of a free rooting capacity, when planted as cuttings or propagated by "stools." In this latter characteristic it differs from the ordinary fruiting varieties of quinces which do not readily strike roots from cuttings planted in the open nursery beds in South Australia.

The scion varieties budded upon these two stocks consisted of Glou Morceau, Beurre Diel, Beurre Easter, and Vicar of Winkfield. The latter was at that period sometimes erroneously called Napoleon, and the first-named "Winter Duchess" in our local markets. The budwood used in propagating the trees planted in these trials was obtained from selected healthy productive types of trees growing in neighbouring orchards. With the exception of Beurre Easter, these sorts were stated in most English horticultural literature available at the time to thrive when worked on the

quince rootstock. In the case of this variety, however, Dr. Hogg's "Fruit Manual," Fifth Edition, page 572, states it is "a good bearer and succeeds well either on the pear or quince stock." If by this it is meant when worked directly on to the quince rootstock, our experience in these 24-year-old trials does not confirm this statement. Further, doubts are also thrown on the likelihood of at least two others, *viz.*, Beurre Diel and Vicar of Winkfield, proving a permanent success when grown directly on the quince rootstock in this warmer and drier climate, and in soils such as are found in the Blackwood State Orchard.

The land devoted to this trial is located in Block D at the western end of the orchard and lies immediately above and parallel to the cherry rootstock trial plot, but across the main central roadway which runs east and west along the southern slope of the orchard property.

[*E. W. Pritchard, photo.*]

Vicar of Winkfield on Pear Seedling Stock.

It is a parallelogram measuring 254ft. long and 34½ft. wide. On the upper long side the ground falls to the west about 24in., and on the lower margin 23in. per chain. Along the eastern end the fall to the north is approximately 21in., and at the western 18in. per chain. It will be noted, therefore, that the surface of the slope is fairly even with a slightly greater fall towards the western aspect.

Soil profiles were examined in four places along the alignment of the trees at a distance midway between the two rows of rootstocks. Each of these inspections was made of the land lying between trees of the same variety of pear worked on the two different rootstocks.

At the eastern end where the Glou Morceau variety was planted, only 7in. to 8in. of brown clay loam seemingly deficient in organic matter overlaid the moist plastic clay which at 10in. became fairly consolidated. A layer of this dark-red clay 14in. thick, but still moist, was resting on a shaly crumbling marl which was 12in. thick. At 50in. below the surface the soil was very solid, but not rocky. Opposite the Beurre Diel trees the surface loam and clay immediately below it coincided with the preceding description. It was readily bored to a depth of 27in. with the soil auger. At 34in. down a crowbar had to be used to loosen the tightly compacted bluish-slate coloured clay. At 42in. down the land became extremely hard but not rocky. Further westward opposite the trees of Beurre Easter, the surface soil had evidently been shallowed by repeated slight erosions. The stiff moist yellowish crumbling clay was met at 8½in.

[*E. W. Pritchard, photo.*]

Beurre Diel on Angers Quince Stock.

below the surface, and persisted for a further 10½in. deep, where it changed into a light slaty-blue clay mixed with broken stones too large to permit boring operations with the 5in. auger. At 41in. deep the land became extremely firm, but no rocky stratum was reached at that depth. At the western end of the slope the ground occupied by the Vicar of Winkfield trees carried a layer of dark clay loam only 6in. deep when plastic red clay was met. There were evidences of erosion here also. This clay rested on a 10in. layer of yellowish marly clay readily bored through. At 21in. deep the clay changed to a blue slaty colour and became quite gritty with particles of broken slate stone offering great resistance to the auger. At 36in. deep the solidity increased but no rocky stratum was reached. The

general opinion formed by the writer respecting this land was that the surface loam is very shallow and poor, both in texture and richness, increasingly so towards the lower western portion occupied by these pear trees.

For the first 2ft to 3ft. in depth, however, the clay and marly sublayers should not offer too great a resistance to the penetration of the pear seedling roots, but would be calculated to repel the more naturally shallow penetrating quince roots. Incidentally it may be mentioned that a plot composed of similar soil occupied by well developed healthy 20-year-old Japanese and European varieties of plum trees worked on seedling Myrobalana plum stocks, runs along the western end of these Pear Rootstock Trials.

[*E. W. Pritchard, photo.*]

Vicar of Winkfield on Angers Quince Stock.

The rootstocks in these trials are planted in two parallel rows running east and west. The trees on the pear seedlings are placed on the upper or southern side adjoining a plot occupied by Peach Rootstock Trials, the quince stocks occupying the lower or northern side next to the central roadway running through this half of the orchard land. If any advantage attached to the headland position, these latter stocks should have received it right throughout the length of the row.

There were three trees of each of four different varieties worked on each of the two kinds of rootstocks, totalling 24 trees in all. They were planted on the equilateral triangular system, 20ft. apart from each other. The three Glou Morceau on pear seedlings at the eastern end of the upper row stand facing in "staggered" order, the three trees of the same variety located in the lower row but worked on the quince rootstocks. The trees

of Beurre Diel, Beurre Easter, and Vicar of Winkfield followed in respective order down the two rows in a westerly direction.

By adopting this method it was thought to localise more strictly any variations in the soils and aspects in the positions occupied by the respective varieties worked on the two stocks. The trees were all planted during August, 1910.

Since that time they have all been subjected to the usual annual cultural treatments deemed necessary to the well-being of orchard trees growing under similar conditions. These consisted of pruning, firstly for shaping, and afterwards for general maintenance, in keeping with the individual evidences of growth and cropping displayed from year to year. They have been sprayed systematically with fungicides and insecticides for the repression of Black Spot (*Venturia pirina*) and Codlin Moth (*Cydia pomonella*), the two pests which are most commonly in evidence in pear trees in this State. The soil tillage has consisted of one early spring or late winter ploughing about 5in. deep, followed by several scarifyings throughout the summer season to maintain a loose pulverized surface layer, approximately 3in. to 4in. in depth.

[*E. W. Pritchard, photo.*]

Beurre Diel on Pear Seedling Stock.

Although no progressive measurements of growth were recorded from these trees from time to time, they were, owing to their location, constantly under observation. It was noted that with the exceptions of the trees of Beurre Easter and one of Vicar of Winkfield, all on quince rootstocks—two of which had to be replaced within the first few years—they all made healthy growth and progress.

At the end of 1916—six years after planting—the other three varieties worked on quince stocks began to slacken somewhat in the extension of their terminal growths or leaders, to form fruitspurs abundantly and display the usual evidences of settling down generally into crop production.

Those on pear seedling stocks, without exception, continued to grow vigorously and although their yields were lighter, they began to bear a sprinkling of pears very soon after a commencement had been made by their respective contemporaries growing on the quince rootstocks. With the above exception of the Easter Beurre on quince roots, the trees all continued to maintain a healthy condition generally until 1922, when one of the Vicar of Winkfield trees on quince stock, which had cropped well for several years, died, and the other trees of this variety on the same stock began to show signs of dying back from the terminal points of the leading limbs.

About 1928 the trees of Beurre Diel on quince rootstocks began—but to a lesser extent—to give evidences of decline in a similar manner. Those of the Glou Morceau, however, on the same kind of stock, continued to retain a healthy condition though practically stationary in stature. None of the trees of Beurre Easter on quince rootstocks at any time made more than a very stunted growth, and in 1924 another tree died. Since then the two survivors have maintained a miserable existence, as the accompanying photographs of the better developed one of them clearly indicates. As these and other trials conducted in the State Orchard at Blackwood have been instituted for demonstration purposes as much as for obtaining data therefrom, these useless trees of Beurre Easter pear grafted directly on to quince rootstocks have been retained in the plot purely as striking examples of what should be avoided when propagating this variety.

In November of this year (1934) trunk measurements were taken of the girth of each tree's rootstock immediately below its line of union with the scion—which was usually found to be several inches above ground level. The girth around the indicated line of fusion of stock and scion variety, and the circumference of the tree stem approximately 6in. above the line of union, were also taken. At the same time, the dimensions attained by the top of each tree were recorded by gauging the height of the leading framework limbs, and of the widest spread of the branches generally. These latter were obtained by measuring horizontally from several points through the branches at right angles and taking the mean or average from these results.

These horizontal gaugings were made at heights above ground ranging between 8ft. and 9ft. on trees worked on Pear Seedlings, and between 3½ft. to 7ft. on those on quince rootstocks. In gauging these heights and widths, one isolated slender branch extending much beyond its fellows in the tree's framework was not accepted as indicating the fair average height or spread of a tree. Although these trees had all been trained to the vase or open-centred goblet form, in a few instances the conical form and central leader natural to most varieties of pears had tried to assert itself.

The small table A shows the averages calculated from these measurements of each tree of each of the four varieties grown on the two rootstocks.

In the cases of the Glou Morceau and the Beurre Diel the quota of three trees of each variety on the two rootstocks were available for measurement purposes, but of the Easter Beurre and Vicar of Winkfield varieties, whilst the full quotas on the pear seedling were present, only two trees of each of these sorts were remaining on the quince rootstocks.

TABLE A.—*Showing Average Measurements of the Growths of Stems and Branches of Four Varieties of Pear Trees worked on Pear Seedling and Angers Quince Rootstocks.*

Rootstock.	Average Girth of Stocks below Union (inches).	Average Girth around points of Union (inches).	Average Girth of Tree Stems 6″ above Union (inches).	Average Heights of Trees (feet).	Average Spread of Branches (feet).	Height of Guaging Branch Spread (feet).
			Variety.—Glou Morceau.			
Pear Seedling, 3 trees.......	$37\frac{3}{4}$	$34\frac{1}{6}$	$29\frac{1}{4}$	15	$17\frac{2}{3}$	9
Quince (Angers), 3 trees.....	32	$31\frac{2}{3}$	$22\frac{1}{3}$	12	$12\frac{1}{2}$	7
			Variety.—Beurre Diel.			
Pear Seedling, 3 trees.......	$26\frac{1}{6}$	25	$23\frac{1}{6}$	$13\frac{2}{3}$	$14\frac{2}{3}$	8
Quince (Angers), 3 trees.....	$19^5/_6$	21	$16^7/_{12}$	$9\frac{2}{3}$	$9^5/_6$	7
			Variety.—Beurre Easter.			
Pear Seedling, 3 trees.......	$27^5/_{12}$	$25\frac{1}{3}$	$23\frac{1}{4}$	$12\frac{1}{6}$	$13\frac{1}{3}$	8
Quince (Angers), 2 trees.....	$11\frac{1}{2}$	$13\frac{1}{2}$	$7\frac{3}{4}$	$4\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{1}{2}$
			Variety.—Vicar of Winkfield.			
Pear Seedling, 3 trees.......	$30\frac{2}{3}$	$27\frac{2}{3}$	$24\frac{1}{3}$	$14\frac{1}{3}$	$14\frac{1}{3}$	8
Quince (Angers), 2 trees.....	$18\frac{1}{3}$	21	18	$7\frac{1}{2}$	$7\frac{3}{4}$	$3\frac{1}{2}$

As previously indicated, these trees have all been moderately pruned and in several instances during later years, large limbs have necessarily been removed where they had been broken off or bent into such a position as to render them obstructive to tillage operations, owing to the great weight of fruits borne by them during certain seasons.

These remarks particularly apply to the trees growing on seedling pear rootstocks, and more especially to two trees of the Vicar of Winkfield variety. Owing to the studied discouragement of further ascension applied when pruning the leaders of the trees growing on seedling pears during recent years, a number of them now show a mean spread about equal to their respective heights.

The trunk measurements set out in Table A when perused in conjunction with accompanying photographs of the butts of the trees, emphasise the smooth, even tapering sturdy character presented by the stems of those worked on pear seedling stocks. The line of fusion of the stock and scion is very clearly definable from the different structural lines of crackling displayed by their respective outer layers of dry bark. No abrupt lateral distention of the stem is present at this point to bear silent witness to the existence of internal disruption between the fusing tissues of stock and scion.

The measurements and photographs of the trunks of the trees grafted on the quince rootstocks on the other hand show that, with the exception of the Glou Morceau variety, they failed to reach the full girth of the trunks of any of the other three varieties worked on them. In fact it may be claimed that the ability of the stock to keep an even pace with the expansion of the tree stem of the variety worked upon it, would be a true measure of the degree of its success in the establishment of a permanent and efficient union.

Influence of the Rootstock on the Quality, Early Cropping, and Gross Production of Fruit.

The accompanying figures set out in Tables B, C, D, and E, present in consecutive order the total annual yields of the trees of the four varieties of pears grown on the respective stocks. The fruits were harvested and graded into first and second qualities. The first grade pears consisted of sound, clean-skinned, well formed fruits above 2½in. in diameter. The second grade embodied all of the remainder of the crop. The first grade would pass as "Standard" export quality, and the bulk of the second grade would meet the usual requirements of local and interstate markets.

TABLE B.—*Cropping Data Relative to Pear Rootstock Trials—Planted 1910. Four Varieties, Three Trees of Each Grafted on Two Different Rootstocks.*

Variety.—Glou Morceau, three trees.

Rootstock.	Pear Seedling.			Quince (Angers).		
Year.	1st Grade.	2nd Grade.	Total (Three Trees).	1st Grade.	2nd Grade.	Total (Three Trees).
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1910 to 1916	—	—	—	—	—	—
1917	43 11	—	43 11	5 6	—	5 6
1918	14 0	15 0	29 0	7 8	6 0	13 8
1919	4 0	4 1	8 1	14 3	7 15	22 2
1920	3 0	29 0	32 0	82 9	35 4	117 13
1921	117 0	38 0	155 0	285 0	76 8	361 8
1922	211 0	69 8	280 8	285 0	78 8	363 8
1923	137 8	92 4	229 12	234 8	132 0	366 8
1924	202 0	77 8	279 8	205 4	125 0	330 4
Total yields, eight-year period	732 3	325 5	1,057 8	1,119 6	461 3	1,580 9
Average annual yield per trial	91 8⅜	40 10⅝	132 3	139 14¾	57 10¾	197 9⅛
Average annual yield per tree	30 8	13 9	44 1	46 10	19 3	65 14
1925	132 0	201 8	333 8	192 0	186 8	378 8
1926	481 0	186 8	667 8	220 0	305 8	525 8
1927	103 0	43 0	146 0	14 0	36 12	50 12
1928	741 0	455 0	1,196 0	242 8	533 8	776 0
1929	253 0	184 8	437 8	21 0	239 8	260 8
1930	367 0	207 8	574 8	2 12	366 8	369 4
1931	72 12	20 12	93 8	10 4	34 0	44 4
1932	694 0	272 4	966 4	172 8	170 0	342 8
1933	375 4	48 12	424 0	259 8	205 12	465 4
1934	936 12	662 12	1,599 8	70 12	524 4	595 0
Total yields, ten-year period	4,155 12	2,282 8	6,438 4	1,205 12	2,602 4	3,807 8
Average annual yield per trial	415 9	228 4	643 13	120 9	260 4	380 12
Average annual yield per tree	138 8	76 1	214 10	40 3	86 12	126 15

TABLE C.—*Cropping Data—Pear Rootstock Trials*—(continued).
Variety.—Beurre Diel, three trees.

Rootstock.	Pear Seedling.						Quince (Angers).					
Year.	1st Grade.		2nd Grade.		Total (Three Trees).		1st Grade.		2nd Grade.		Total (Three Trees).	
	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.
1910 to 1915	—		—		—		—		—		—	
1916	—		—		—		2	10	—		2	10
1917	0	10	—		0	10	180	15	—		180	15
1918	11	0	8	0	19	0	85	0	—		85	0
1919	129	0	5	0	134	0	188	0	14	0	202	0
1920	48	3	6	4	54	7	165	0	49	12	214	12
1921	322	8	21	0	343	8	358	0	56	0	414	0
1922	151	0	8	0	159	0	37	0	11	0	48	0
1923	314	0	61	0	375	0	158	0	261	0	419	0
1924	523	4	88	8	611	12	441	4	101	8	542	12
Total yields, nine-year period	1,499	9	197	12	1,697	5	1,615	13	493	4	2,109	1
Average annual yield per trial	166	$9^{8}/_{9}$	21	$15^{5}/_{9}$	188	$9^{4}/_{9}$	179	$8^{5}/_{9}$	54	$12^{8}/_{9}$	234	$5^{4}/_{9}$
Average annual yield per tree	55	9	7	5	62	14	59	14	18	4	78	2
1925	187	12	44	8	232	4	127	8	54	8	182	0
1926	255	0	170	8	425	8	198	8	168	8	367	0
1927	129	0	20	0	149	0	144	8	21	8	166	0
1928	91	4	27	0	118	4	260	4	92	8	352	12
1929	344	8	160	0	504	8	15	8	204	8	220	0
1930	312	0	111	0	423	0	88	8	117	0	205	8
1931	48	0	19	12	67	12	5	8	1	8	7	0
1932	518	4	222	12	741	0	68	0	209	0	277	0
1933	592	0	339	0	931	0	176	0	119	8	295	8
1934	590	8	155	0	745	8	60	0	103	0	163	0
Total yields, ten-year period	3,068	4	1,269	8	4,337	12	1,144	4	1,091	8	2,235	12
Average annual yield per trial	306	13	126	15	433	12	114	7	109	2	223	9
Average annual yield per tree	102	4	42	5	144	9	38	2	36	6	74	8

TABLE D.—*Cropping Data—Pear Rootstock Trials*—(continued).
Variety.—Beurre Easter, three trees.

Rootstock.	Pear Seedling.			Quince (Angers).		
Year.	1st Grade.	2nd Grade.	Total (Three Trees).	1st Grade.	2nd Grade.	Total (Three Trees).
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1910 to 1916.........	—	—	—	—	—	—
1917.........	5 4	—	5 4	—	—	—
1918.........	45 8	—	45 8	—	—	—
1919.........	262 10	11 6	274 0	—	—	—
1920.........	269 4	71 4	340 8	—	'4 0	4 0
1921.........	408 0	112 8	520 8	—	—	—
1922.........	363 8	97 8	461 0	—	—	—
1923.........	264 0	68 8	332 8	—	—	—
1924.........	474 12	122 8	597 4	—	15 12	15 12
Total yields, eight-year period	2,092 14	483 10	2,576 8	—	19 12	19 12
Average annual yield per trial	261 9¾	60 7¼	322 1	—	2 7½	2 7½
Average annual yield per tree	87 3	20 2	107 6	—	0 13	0 13
1925.........	201 8	252 0	453 8	—	14 0	14 0*
1926.........	279 8	98 0	377 8	—	11 8	11 8
1927.........	386 0	30 8	416 8	—	—	—
1928.........	136 8	117 8	254 0	—	—	—
1929.........	250 8	225 0	475 8	—	—	—
1930.........	346 8	86 8	433 0	—	—	—
1931.........	113 8	57 8	171 0	—	—	—
1932.........	434 4	22 12	457 0	—	8 4	8 4
1933.........	510 8	237 8	748 0	—	—	—
1934.........	140 4	31 0	171 4	—	—	—
Total yields, ten-year period	2,799 0	1,158 4	3,957 4	—	33 12	33 12
Average annual yield per trial	279 14	115 13	395 12	—	3 6	3 6
Average annual yield per tree	93 5	38 10	131 15	—	1 11	1 11

' Two trees only; one tree on quince died 1924.

TABLE E.—*Cropping Data—Pear Rootstock Trials*—(continued).
Variety.—Vicar of Winkfield, three trees.

Rootstock.	Pear Seedling.			Quince (Angers).		
Year.	1st Grade.	2nd Grade.	Total (Three Trees).	1st Grade.	2nd Grade.	Total (Three Trees).
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1910 to 1915	—	—	—	—	—	—
1916	—	—	—	14 5	—	14 5
1917	—	—	—	86 7	—	86 7
1918	—	—	—	95 0	—	95 0
1919	28 8	0 12	29 4	204 12	77 0	281 12
1920	47 7	1 0	48 7	58 4	46 0	104 4
1921	448 8	88 0	536 8	226 0	145 8	371 8
1922	123 0	17 0	140 0	139 0	27 8	166 8
1923	274 8	121 0	395 8	90 8	53 0	143 8*
1924	214 0	200 0	414 0	82 8	120 8	203 0
Total yields, nine-year period	1,135 15	427 12	1,563 11	996 12	469 8	1,466 4
Average annual yield per trial	126 $3^4/_9$	47 $8^4/_9$	173 $11^8/_9$	110 12	52 $2\frac{2}{3}$	162 $14\frac{2}{3}$
Average annual yield per tree	42 1	15 13	57 15	36 15	17 6	54 5
1925	194 0	295 8	489 8	105 0	67 0	172 0
1926	232 0	120 0	352 0	158 8	96 8	255 0
1927	68 8	58 8	127 0	11 8	5 0	16 8
1928	155 8	243 8	399 0	112 8	235 8	348 0
1929	39 8	318 8	358 0	15 8	4 12	20 4
1930	214 0	398 8	612 8	1 0	206 0	207 0
1931	46 8	16 8	63 0	—	—	—
1932	203 0	260 4	463 4	99 8	71 12	171 4
1933	305 12	311 8	617 4	48 8	47 4	95 12
1934	425 8	175 8	601 0	23 8	122 0	145 8
Total yields, ten-year period	1,884 4	2,198 4	4,082 8	575 8	855 12	1,431 4
Average annual yield per trial	188 7	219 13	408 4	57 9	85 9	143 2
Average annual yield per tree	62 13	73 4	136 1	28 12	42 12	71 9

/* Two trees only, one tree on quince rootstock died in 1922.

It is claimed by many European horticultural writers that the quality attained by most varieties of pears is superior both in colour and flavour when the sorts are compatible with, and grown on, the quince rootstocks. Whilst this claim may be granted for a limited period after the fruiting stage has commenced, it has not, at any rate under the conditions of soil and climate prevailing at Blackwood, been found to persist very long excepting in one instance.

In analysing the data contained in Tables B to E in this report, it will be seen in the case of the *Glou Morceau* variety that at the end of the first cropping period of eight years, *viz.*, in 1924, the three trees on the quince stocks had yielded 523lbs. more in weight of pears than the three comparative trees on the pear seedling rootstocks, and of this increase 387lbs. consisted of first grade fruit. This represents an advantage of 52.88 per cent. more first grade pears than was borne on the trees on the pear seedling stock. In the results obtained during the next 10-year period (1934), however, the positions had been reversed. The trees growing on pear seedling showed a gross increase in yield of 2,630lbs. over that produced on those worked on the quince rootstocks, and 2,950lbs. or equal to 244.66 per cent. represented the increase in first quality fruit over that carried by the trees on quince roots. Viewed from another angle, the percentage of first quality fruit in the gross yield from the trees on pear seedling stock receded from 69.23 per cent. in 1924 to 64.54 per cent. in 1934, whilst the percentage of first grade in the gross yields of those on the quince stocks fell from 70.88 per cent. to 31.66 per cent. during the same period. Covering the full 18-year period of fruiting recorded from 1917 to 1934 inclusive, the three trees on pear seedling stocks yielded 65.20 per cent. of first grade pears, and those grown on the quince stocks produced 43.14 per cent. of first quality fruits.

At the end of the 1924 period the three trees of *Beurre Diel* worked on quince rootlings had yielded nine crops, and those on the pear seedling had fruited eight times. As this first crop on the former weighed only 2lbs. 10ozs. it is practically negligible. In the 1916 to 1924 period the trees of Beurre Diel on the quince stocks had produced a gross weight of 411lbs. of pears greater than those grown on the trees on pear seedling. This contained 116lbs. or equivalent to 7.75 per cent. more first grade fruits than were borne on the trees on pear seedling.

Taking the percentages of their aggregate yields, the trees on the pear seedling stocks graded out 88.34 per cent. of first quality, whilst those from the trees on quince roots showed 76.61 per cent. During the subsequent 10-year period ending 1934, the gross crops from the trees on the pear seedling stocks had outweighed those from the trees on the quince roots by 2,102lbs., including an advantage of 1,924lbs., or an equivalent to 168.18 per cent. more of first grade fruit than that produced by the trees on the quince stocks. During this second period the percentages of the gross total yields from the trees on pear seedling and quince stocks which were graded first grade, were 70.73 per cent. and 51.18 per cent. respectively.

Taking the yields of the full cropping periods, *viz.*, 18 and 19 years respectively, for the trees on pear seedling and quince rootlings, the three trees of Beurre Diel on the former rootstocks bore 1,690lbs. more fruit than the same number of trees on the latter. Of the gross yield of 6,035lbs. on the pear stocks 75.68 per cent. has been first grade, whilst of the aggregate of 4,344lbs. harvested from the trees of quince stocks, 63.52 per cent. has been of that quality.

These figures show that whilst the gross increase in yield was 38.89 per cent., the increase in first grade fruit has been 65.49 per cent. in favour of the trees grown on pear seedling stocks.

The production of fruit from the trees of *Beurre Easter* grown directly on to the quince rootstocks has been so indifferent that no further comment is offered at this stage other than to state that the few fruits borne on these trees could not be identifiable as arising from scions taken from the same tree as were those which are growing on the pear seedling stocks immediately adjacent in the next row.

Instead of developing into a fleshy pear somewhat above medium size which ripens into a luscious, juicy, well-flavoured fruit, these pears scarcely grew to the size of a golf ball and remained a hard mass of lignified cells entirely lacking in juiciness or flavour. This change of character in the fruit could not be attributed to over-croppng, as a tree of similar size and leaf spread growing on an appropriate stock would have developed these few fruits to a normal, or what is more likely, an abnormal state of development in so far as size is concerned.

[*E. W. Pritchard, photo.*]
Glou Morceau on Pear Seedling Stock.

The trees of *Vicar of Winkfield* on the quince rootstock began to crop in 1916, and those on the seedling pear in 1919—three seasons later. At the end of the 1924 period the former had borne nine crops and the latter six only. Notwithstanding this discrepancy, the three trees of this variety growing on the pear seedling stocks had produced 97lbs. more pears than those on the quince roots. This is perhaps partly attributable to the fact that one of the trees on the latter stock died in 1922. At any rate, the percentages of first grade pears in the gross yields were 72.63 from the trees on pear as against 67.97 on the quince rootstocks.

During the next 10-year period to 1934 the gross yield from three trees of this variety growing on pear stocks exceeded that borne on two trees on quince stocks by 2,621lbs. (If calculated on an equal unit basis of trees the excess would still reach 1,936lbs. in favour of those grown on the pear stocks.)

The percentages of first grade pears from the total yields of the trees on pear seedling and quince rootling stocks were 46.15 and 40.21 respectively, during this period.

A summary of the total yields from the 16 consecutive yearly crops of the three trees of Vicar of Winkfield on pear seedling stocks, and seven yearly crops from three trees and 12 crops from two trees of the same variety grown on the quince stocks shows that the former returned 5,646lbs. of pears, of which 3,020lbs., or 53.48 per cent. were first grade. The trees on the quince stocks produced 2,897lbs. gross, of which 1,572lbs., or equal to 54.26 per cent., were classed as first grade.

The total croppings of the four varieties of pears worked on the respective rootstocks, as recorded from 1916 to 1934, inclusive, indicate that from 12 trees grown on pear seedlings a gross yield of 25,711lbs. was harvested. Of this total 17,368lbs., or 67.55 per cent. consisted of first grade fruit. The trees grown on the quince rootstocks returned 12,684lbs. gross, from which 6,657lbs., or 52.48 per cent., were first grade pears.

Any evidence regarding the influence of the rootstock in promoting the earlier arrival of the cropping stage, and thereafter increasing the production of fruit in the aggregate, as indicated in the records of these trials, may be summarised as follows:—

From the trees of *Glou Morceau* variety grafted on seedling pear and Angers quince rootlings, and planted out in the trial plot at Blackwood in 1910, the first fruits were recorded from trees on both stocks in 1917. Those growing on the quince rootstocks, however, rapidly secured, and for 11 years held priority of place in aggregate production, *viz.*, until 1928.

The *Beurre Diel* trees on the quince rootstocks produced the first fruits in 1916; those on pear seedlings began to crop sparingly in the following season (1917). The trees of this variety worked on the quince maintained the leading position in gross production for 16 years, *i.e.*, until 1931.

Those of *Beurre Easter* worked on pear seedlings began to crop in 1917, and the trees of this variety grafted on the quince produced their first few straggling pears in 1920. As the trees of this variety grafted on quince rootstocks bore only a few fruits intermittently throughout the period of the tests, the quantities in the aggregate are not worth consideration or comparison with the fine yields produced on the trees on pear seedling stock in the adjacent row.

The *Vicar of Winkfield* trees grafted on the quince stocks began to crop in 1916, and those of the same sort on pear seedlings three seasons later, *viz.*, in 1919. Nothwithstanding this lead at the start those on the pear seedling stocks had in 1924 overtaken the aggregate yield of those on the quince rootstocks. It is true that one tree of this variety on the latter stock had died in 1922, but subsequent crops harvested from the other two show that, after allowing for an average increment equivalent to the loss of crop therefrom in 1923 and 1924 seasons, this primary position must have been reached in 1925 harvest by the trees on the pear seedling stocks.

It will be seen, therefore, that any appreciable advantage accruing from the earlier cropping by pear trees worked and grown on quince roots could be realised only wherever very special circumstances made this procedure worth while.

As previously mentioned, the trees in this trial plot were planted 20ft. apart on the equilateral triangular system which permits space for setting out 125 trees per acre area. Using the very complete cropping data given in Tables B to E as a basis for calculation, it should be possible, under conditions of soil and climate similar to those prevailing in the State

Orchard at Blackwood, for the results set out in Table F to be obtained from an acre of pear trees of the varieties named in this report, or of other equally productive kinds when worked on pear seedling; or if compatible, on the Angers quince rootstocks. The yields are quoted in pounds avoirdupois, but to translate these weights into bushels they may be divided by 47, which is the approximate weight of a bushel of average varieties of pears grown in this State.

TABLE F.—*Total Crop Yields Calculated as Obtainable within 24 Years after Planting an Acre of Orchard Land with 125 Pear Trees worked on Seedling Pear and Angers Quince Rootstocks respectively.*

Rootstock.—Seedling Pear.		Quince (Angers).	
Variety.—Glou Morceau.			
	Lbs.		Lbs.
No. of crops, 18—		No. of crops, 78—	
First grade	203,666	First grade	96,875
Second grade	108,666	Second grade	127,625
Total	312,332	Total	224,500
Variety.—Beurre Diel.			
No. of crops, 18—		No. of crops, 19—	
First grade	190,333	First grade	115,000
Second grade	61,125	Second grade	66,041
Total	251,458	Total	181,041
Variety.—Beurre Easter.			
No. of crops, 18—		No. of crops, 5—	
First grade	203,833	First grade	—
Second grade	68,417	Second grade	2,208
Total	272,250	Total	2,208
Variety.—Vicar of Winkfield.			
No. of crops, 16—		No. of crops, 19—	
First grade	125,833	First grade	81,083
Second grade	109,417	Second grade	76,645
Total	235,250	Total	157,728

The Present Condition of the Pear Trees.

As the pear is amongst the longest lived of all the kinds of orchard trees we cultivate, the condition of those under review in respect to their general healthfulness and anticipated future production must of necessity receive due consideration at the end of a 24-years' trial.

The writer has attempted to show from growth measurements and crop yields recorded during that period that, as far as these trials go, the pear tree when grafted on rootstocks of its own species would ultimately be calculated to prove more profitable than when propagated on the Angers quince rootlings.

At the present time the three trees of *Glou Morceau* variety growing on the pear seedling stocks are healthy, well-developed trees, making extensions freely, but not to excess, ranging from 6in. to 18in. in length on laterals and leaders throughout the trees. They convey the impression of possessing a capacity to continue to give heavy yields similar to those recorded from them during recent years.

The three trees of the same variety growing on quince stocks in the adjacent row are also healthy and making a moderate number of annual shoots varying from three inches to a foot in length, but the higher points of the leading limbs are more or less at a standstill.

[*E. W. Pritchard, photo.*]

Beurre Easter on Angers Quince Stock.

In respect to the quince rootstocks themselves, their girths now extend beyond the circumference of that of the stem measured around the line of union with the scion variety of pear. Admitting that the prospects for future cropping in respect to these trees are equally promising as those from trees on the pear seedling stocks, still, based on past performances an increase of 59 per cent. in the number of similar trees per acre of orchard would be required to bring their aggregate yields up to that promised by the trees on pear seedling stocks.

The three trees of *Beurre Diel* on pear seedling stocks are equally healthy and thriving, though a little smaller in stature than those of Glou Morceau. Their gross productiveness promises to continue to be very high.

The three trees of this variety on the quince stocks are now dwarfed and stunted, though healthy in general appearance. The evidences of active growth are scattered and limited to a few shoots from 6in. to 12in. long.

The rootstocks are reasonably even in circumference, but are uniformly smaller than the diameter through the stem at the line of union with the pear scion. One wonders how such small trees as these could have produced the weights of pears borne by them in the past, but the yields have fallen during recent seasons, and all outward evidences indicate that a further and considerable decrease will take place in the future.

The three trees of *Beurre Easter* on pear seedling stocks are healthy and thriving, showing to a very desirable degree annual extensions on laterals and leaders. The rootstocks and scions have merged into the formation of even tapering stems. Though excelled in the aggregate yields by the two preceding varieties, these trees have been consistently productive since their third year of cropping, and promise to continue to bear well in future.

[*E. W. Pritchard, photo.*]

Glou Morceau on Angers Quince Stock.

The two surviving trees of this variety on the quince stocks grow very slightly and crop even less—the fruits being quite valueless. The rootstocks have swollen beyond the girth of the scion variety, and they appear to have been irregularly supplied with main roots. This latter feature may be accidental but the trees are consistently lopsided in this respect.

The surface soil at this position on the plot becomes undoubtedly less tractable for root action than further eastward where the two former varieties are growing on this rootstock.

Two of the three trees of *Vicar of Winkfield* variety growing on the pear seedling are declining somewhat, and fairly large limbs have from time to time been cut away from them in consequence of this. Their foliage seems healthy, but scanty compared with that on the third specimen. The rootstocks have made perfect unions with the stems forming even tapering

trunks on two of the trees. The third and most westerly tree is a fine healthy-looking specimen, substantiating in a practical manner the suspected improvement in the quality of the soil on this extreme end of the plot. Excepting this one, these trees of Vicar of Winkfield on the pear seedling are not showing much promise of continuance of the good yields recorded during the past few seasons from them. They are located where the surface soil has become shallow owing to water movements slowly and persistently removing the lighter and richer top soil.

The two remaining trees of this variety on the quince rootstocks are dwindling in stature and are generally in an indifferent condition of vitality. The rootstock in each instance is smaller than the tree trunk, and the promise for development is not encouraging. The yields from these trees are diminishing and will probably decline at a greater rate during the next few seasons. The soil hereabouts is poor in texture owing to surface erosions and lack of organic matter.

Whatever may be achieved from the use of the quince as a rootstock for these varieties of pears when grown in deep rich moisture-holding flat lands, the writer is convinced that when planting pear trees on the shallower and more quickly drying clay loams of the hill slopes—such as are found in most of our coastal fruitgrowing centres in this State—it is not advisable to use this stock. In these trials no manures or fertilisers were applied, and consequently, whatever elements of fertility were removed by the repeated slight surface erosions from a portion of the western end of the plot must, to some degree at any rate, account for the great discrepancies in tree development and cropping displayed by certain trees of some of the varieties growing on both kinds of rootstocks in that particular portion of the area.

Although not hitherto referred to as calculated to have a bearing on the future choice of rootstocks for pear trees, the advent of the pear root Woolly aphis (*Eriosoma pirina*) into the pear orchard of this State since these trials have been in progress, has opened up a new and unsuspected aspect of this important question. This pest has been observed to show a distinct partiality for the roots of the French seedling pear stocks, and more particularly when planted in loamy hillside soils in the Mount Lofty Ranges. At it does not attack any portion of the tree above ground, artificial methods of prevention appear to be inapplicable or uneconomic, and no help would appear to be derivable from the introduction of the *Aphelinus* or allied genera of insects parasitic on aphides. It is therefore evident that notwithstanding its proved suitability as a rootstock for orchard pear trees, some type or variety of *Pyrus communis* which is highly resistant to the attacks of this root aphis must be discovered and propagated vegetatively for use as a substitute rootstock. The Horicultural Branch of this Department has, in co-operation with one of the leading fruit tree nurserymen, already moved in this direction, and selected a number of apparently resistant seedlings from beds of badly infested seedling pears. These have been propagated by root grafting and kept under observation. After about five years propagating and culling, the most resistant to the root aphides have mostly proved to be difficult of propagation, so that the discovery of a pear stock which will do for the pear growers what the Northern Spy has done for the Australian apple growers in circumventing the attacks of a serious root-inhabiting pest, would appear to be a time-consuming, but, nevertheless, a very essential quest.

(To be continued.)

THE WEED *CITRULLUS COLOCYNTHIS* (COLOCYNTH), A PERENNIAL WILD MELON.

[By H. C. TRUMBLE, M.Agr.Sc. (Agronomist) and C. M. EARDLEY, B.Sc. (Curator of Herbarium), Waite Agricultural Research Institute.]

INTRODUCTION.

Two species of annual wild melon have been known in South Australia for a considerable number of years. These are the Bitter Melon (*Citrullus vulgaris*, Schrad.), and the Paddy Melon (*Cucumis myriocarpus*, Naud.), both of which have been introduced from South Africa (1).

Recently attention was drawn by Mr. D. Sargent of Naidia to the presence, between Swan Reach and Maggea of a third type of melon, similar in many respects to the annual bitter melon, but perennial in character, and possessing certain features tending to render it a serious weed under cultivation. This perennial type has been received at the Waite Institute and identified both at Adelaide and at the National Herbarium, Melbourne, as the Mediterranean Colocynth (*Citrullus Colocynthis* (L.), Schrad.). This appears to be the first record of the plant in Southern Australia. It was recorded at Townsville, Queensland in 1926 (8).

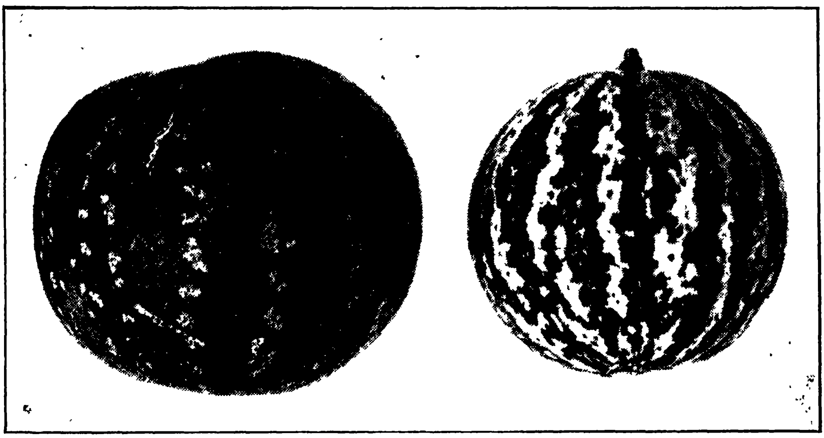


Figure 1.—Fruit of the Bitter Melon (*C. vulgaris*) left, and the Colocynth (*C. Colocynthis*) right.

According to Mr. Sargent, the weed appeared at Swan Reach approximately ten years ago but little notice was taken of it as it was considered to be the ordinary annual Bitter Melon. The local council is said to have considered it as a new weed, but was informed that it was the ordinary melon (*C. vulgaris*).

Two years ago a flock of 200 sheep was taken from Swan Reach to Naidia after remaining in the stock yards at Swan Reach in a hungry condition. Whilst the sheep were at Swan Reach they apparently ingested a quantity of the fruits and seeds of the Colocynth. On arrival at Naidia, the sheep were turned into a paddock of from 100 to 150 acres, and according to report numerous plants of Colocynth appeared in the paddock the following season. These have been removed by hand pulling or grubbing but seedlings still continue to appear. Mature plants of the Colocynth are evident along the roadside from Swan Reach to Naidia, and its present distribution appears to be from Swan Reach to Maggea, a distance of 28 to 30 miles. It has also been recorded at Waikerie however, and it possibly occurs at other points along the river as well.

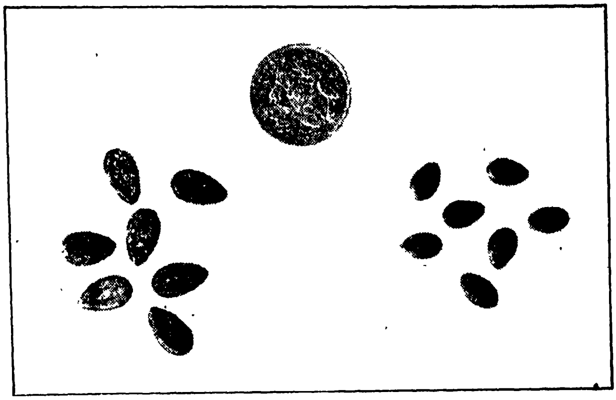


Figure 2.—Mature seeds of the Bitter Melon (*C. vulgaris*) left, and the Colocynth (*C. Colocynthis*) right.

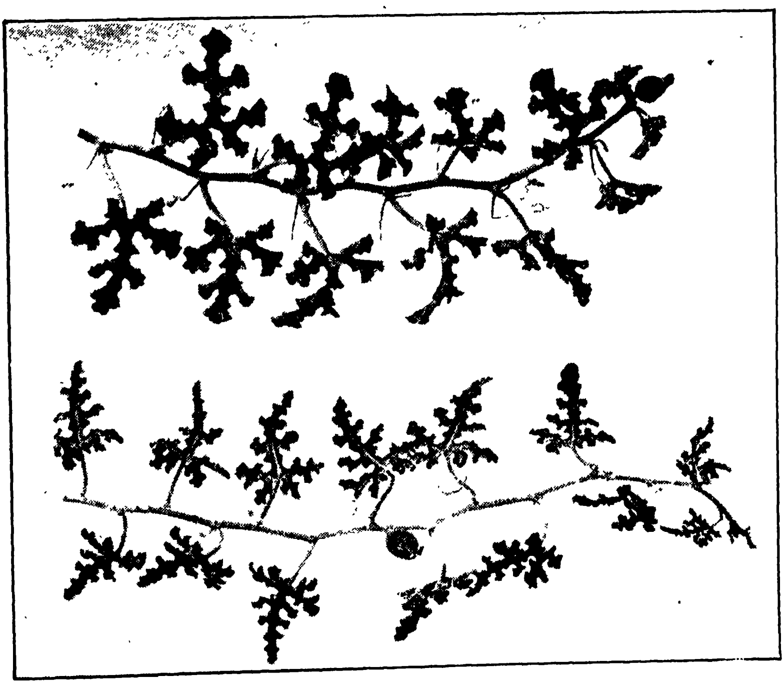


Figure 3.—Leaves of the Bitter Melon (*C. vulgaris*) above, and the Colocynth (*C. Colocynthis*) below.

ANNUAL TYPES OF WILD MELON.

The ordinary Bitter Melon, also called "Wild," "Bastard" or "Cow Melon," is a fairly common weed and quite well known to farmers in the southern parts of the State. Though J. M. Black in his "Flora of South Australia" records it as far north as Oodnadatta, it is chiefly found on sandy land, particularly in the settled districts of the Murray Mallee and close to the sea.

A distinction should be drawn between this species and the Paddy Melon which often grows in association with the Bitter Melon. The two species are alike in possessing long creeping stems with tendrils, small yellow flowers and leaves of a similar nature, but the fruit of the Paddy Melon is only one inch or less in diameter, that is, no bigger than a golf ball, but often smaller, and conspicuously

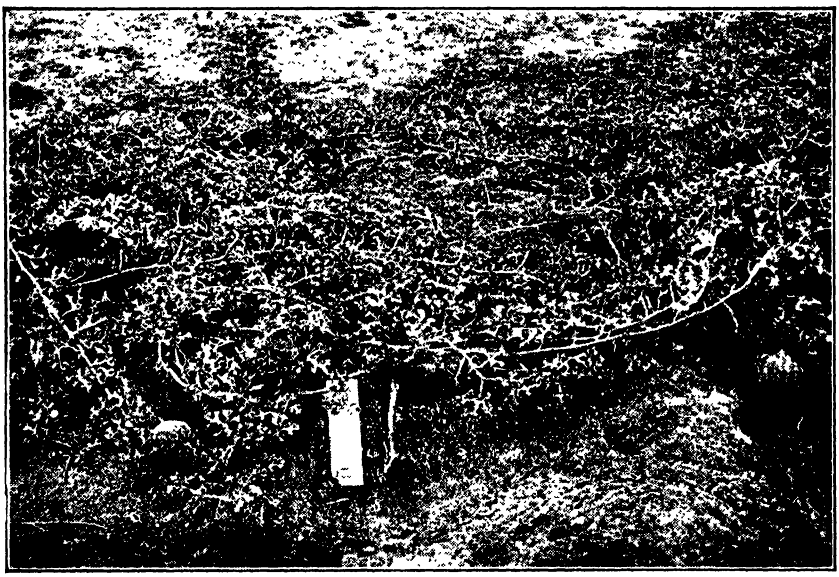


Figure 4.—Plant of the Bitter Melon (*C. vulgaris*), showing habit of growth, root system and fruits.

covered with soft, harmless prickles, like some varieties of gherkins. The fruit of the Bitter Melon, on the contrary, has quite a *smooth rind,* although it is hairy when small and it is similar to the garden Water Melon externally. It is round, large, varying in diameter from 2½ins. to 6ins., and it resembles the Water Melon on being cut open, except that the flesh is whitish instead of pink. The taste is bitter, and the seeds are mottled instead of black; the Water Melon and Bitter Melon are, in fact, the cultivated and wild forms respectively of the same species (Black).

The Colocynth is somewhat similar in appearance to the ordinary Bitter Melon (Black, Fl. S.A.) and specimens of the former have apparently been previously regarded as the annual Bitter Melon.

The following account describes the more important field differences between these plants and will enable ready identification to be made.

THE COLOCYNTH (*C. COLOCYNTHIS*).

1. The tap-root is *perennial,* hard, woody and conspicuous (Figs. 5 and 6), 2ins. to 6ins. in diameter, *bulky at the crown* and more than 3ft. in length.

2. *Both* sides of the leaf are covered with short stiff hairs and feel rough to the touch.

3. The plants are *greyish-green,* rather straggling in appearance, with the leaves regular and on long stalks, *showing much of the stem.*

4. The ripe fruits are rarely more than three or at the most four inches in diameter, lightish in colour, with longitudinal bands of yellow alternating with *speckled* bands of green.

5. The ripe seeds are characteristically oval and flattened, dull yellow in colour, *without markings* and ¼in. or very little more in length.

THE BITTER MELON (*C. VULGARIS*).

1. The tap-root is *annual, slender* and relatively soft (Fig. 4).

2. The leaves are rough below but *smooth above.*

3. The plants are a fresher or more *succulent green,* less straggling in appearance, with less conspicuous leaf stalks, less regular and larger leaf lobes and *showing less of the stem* (Fig. 3).

Figure 5.—Plant of the Colocynth (*C. Colocynthis*), showing stems, root system and fruits.

4. The ripe fruits are very hairy when young and small, up to 6ins. in diameter when mature, darker and greener in colour than the Colocynth and with *narrower* and *less distinct longitudinal bands* of yellow, which are broken, forming discontinuous patches (Fig. 1).

5. The ripe seeds are similar in shape to those of the Colocynth but noticeably larger—almost ⅜in. compared with ¼in.—white at first, but when mature pale brown in colour with *fine black markings* (Fig. 2).

METHOD OF CONTROL.

The eradication of both the Paddy Melon and the Bitter Melon is comparatively simple in practice both plants being annuals.

In the case of the Colocynth however, the perennial root system must be destroyed in order to eliminate the weed. Ordinary methods of cultivation appear to be ineffective as cut portions of the crown are capable of renewed vegetative growth. Mr. D. Sargent finds that it is necessary to hand-grub and burn both the root portion and the fruits, before the latter have become dry, when the seeds are set free.

Sheep are reported to eat the fruits of both the Bitter Melon and the Colocynth on certain occasions, probably when hungry, with other green material scarce. An instance of the manner in which sheep can spread the seeds has already been given and it is probable that the seeds are capable of remaining in the soil for several years before germinating. In this connection it is interesting to find (6) that the fruits of *C. Colocynthis* are used by the people of the Nile for smearing their water bags to prevent camels from damaging them.

The Colocynth is said to be poisonous in large quantities; the dried pulp of the fruit has a drastic purgative action and is used in pharmacy (7).

In handling plants of Colocynth growing near Swan Reach, a highly objectionable odour was observed after pulling or bruising the vegetative portions.

Figure 6.—Old plant of Colocynth (*C. Colocynthis*), showing well developed root system and accumulation of old fruits.

SUMMARY.

Specimens of a perennial wild melon which has appeared at Waikerie and Swan Reach have been received, and identified as *Citrullus Colocynthis* (Colocynth), a Mediterranean plant not previously recorded in South Australia.

The plant resembles the well known Bitter Melon, *Citrullus vulgaris,* but is more difficult to eradicate on account of its woody, perennial root system. A description is given, enabling the Colocynth to be readily identified.

ACKNOWLEDGMENTS.

Thanks are due to the National Herbarium, Melbourne, for the confirmatory identification of the Colocynth, to Mr. A. D. Cocks, who carried out the photography, and to Mr. D. Sargent, who brought the weed to our notice.

REFERENCES.

(1) Black, J. M., Flora of South Australia, p. 544 (1922-1929).
(2) Boissier, Edmond, Flora Orientalis, ii. p. 759 (1872).
(3) Engler n. Prantl., Naturliche Pflanzenfamilien, Teil iv., abt. 5, pp. 27, 1st Ed. (1897).
(4) Haines, H. H., The Botany of Bihar and Orissa, iii., p. 393 (1922).
(5) Oliver, Daniel, Flora of Tropical Africa, ii., p. 548 (1871).
(6) Pammel, L. H., Manual of Poisonous Plants, p. 749 (1911).
(7) Squire, J. W., Companion to the British Pharmacopoeia, p. 507 (1916).
(8) White, C. T. and Francis, W. D., Proc. Roy. Soc. Queensland 37: p. 161 (1926).

SOUTH-EASTERN MEADOW HAY COMPETITION, 1934-35.

[Conducted under the auspices of the S.A. Committee of the Australian Dairy Council.]
Judged by E. S. Alcock, R.D.A., Agricultural Instructor.]

DETAILS OF ENTRIES.

Position.	Name and Address.	Suitability of Plants. 25	Curing. 25	Stage of Cutting. 15	Apparent Nutritive Value. 25	Storing. 10	Total. 100
1	R. J. Wookey, Robe......	23	25	14	22	8	92
2	E. Fenson, Millicent	24	24	14	21	8	91
3	Mrs. G. D. Stuckey, Rensham	23	23	13	22	7	88
4	W. K. Chambers, Mil Lel .	22	23	12	21	9	87
4	I. Sims, Glencoe (1)	22	23	12	21	9	87
4	L. Watson, Millicent......	23	23	14	21	6	87
7	O. Bruh, Mount Gambier.	23	22	14	21	6	86
7	A. P. Spehr, O.B. Flat ...	24	22	13	20	7	86
7	Fartch Bros., Burrungule .	22	22	13	20	9	86
7	I. Sims, Glencoe (2)	21	23	14	19	9	86
11	J. M. Wray, Hynam (1) ..	22	21	14	20	7	84
12	Mrs. G. D. Stuckey, Rendelsham	22	20	11	19	8	80
12	C. W. Thomas, Glencoe ..	21	18	12	20	9	80
12	A. C. Kemp, Millicent	20	20	14	18	8	80
12	F. W. Button, Yahl	21	18	14	19	8	80
16	Alan Koop, Glencoe	20	20	12	19	8	79
16	W. H. Blackmore, Glencoe	19	21	13	18	8	79
16	J. M. Wray, Hynam (2) ..	21	19	13	19	7	79
19	C. Childs, Glencoe	21	18	12	18	8	79

Mr. Alcock's remarks on the winning entry were as follows :—

An excellent one, showing that care had been experienced in making and curing the hay. Mr. Wookey makes a practice of waiting until the pasture is ready, then he cuts it and leaves it until ready for cartage. This year, on account of hot weather, it was only cut two days before he stacked it.

Suitability of Plants.—These consisted mainly of Kentucky Blue, Strawberry Clover, King Island Melilot, Rib Grass, Black Medic, and Perennial Rye Grass. Thus, a good mixture of grasses and legumes was obtained.

Curing was done carefully before the hay dried out and bleached. The plants retained their green colour, and were in excellent condition and handled exceptionally well.

Stage of Cutting.—The pasture was cut on 24th November, before the grasses had matured, and also before the Melilotus was too stalky and coarse. This most important item needs attention when making grass hay.

Apparent Nutritive Value.—A very attractive sample of grass hay. It was very palatable, of good appearance, and an even proportion of grasses and clover mixed together. Strawberry Clover was introduced into the mixture, which, although rather hard to cure, always improves palatability.

Storing.—The stack was well built, and had been carefully thatched with cutting grass.

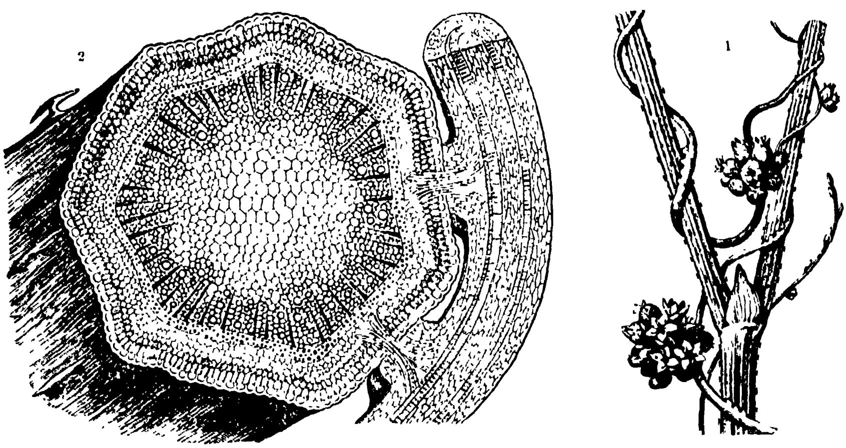
IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 14.—DODDER.

Cuscuta Epithymum, L., *et spp.*

The Dodders, or *Cuscutas*, are leafless twining parasites which nourish themselves at the expense of various other plants, attaching themselves by means of special suckers termed *haustoria*, which penetrate the tissues of the host stems and establish connections with their conducting systems. They are devoid of chlorophyll—the green pigment typical of most plants—the slender stems being red or yellowish in colour instead of green; consequently they are dependent upon the hosts they infest for elaborated foods as well as for supplies of water and mineral salts. In all, there are about 100 species of Dodder, the genus *Cuscuta* being represented in most temperate and tropical countries of the world. Apart from those introduced, there are three species in Australia, and these are to be found growing parasitically upon various native shrubs and herbs, mostly of small



(*After Kerner and Oliver.*)

Figure 1.—*Cuscuta europaea* **parasitic on a hop-stem.**

size. With the exception of a few American species which occur on trees, the great majority of true Dodders attack only small herbaceous or shrubby plants. But the Dodders are very closely simulated, as regards their general habit, by species of *Cassytha*, another genus of leafless twiners, several species of which are found abundantly throughout Australia as parasites upon many different native plants including many tall shrubs and trees. Though quite unrelated, botanically, to *Cuscuta*, the *Cassythas*, or false Dodders, are so similar in their manner of growth that they are often called Dodders, especially by foresters. Thus the "Dodder" of Australian foresters is not the true Dodder, but one of the larger species of *Cassytha*, e.g., *C. melantha* or *C. pubescens*, etc., and is easily distinguishable from species of *Cuscuta*, quite apart from differences in structure and arrangement of the flowers and fruits, by its green colour due to the presence of chlorophyll, and by the greater tensile strength and, in some species, much greater coarseness of the twining stems. Owing to their chlorophyll the false Dodders are only partially parasitic upon the plants they attack; like Mistletoe and its allies, species of *Cassytha* are able to synthesise their own foods, and absorb only

water and mineral substances from the branchlets of the hosts on which they grow. On the other hand, species of *Cuscuta,* or true Dodder, are unable to effect such a synthesis, and so are entirely parasitic upon the host plants attacked. It has been stated that the true Dodder does form a small amount of chlorophyll under certain conditions, but this is, however, exceptional.

Certain European species of *Cuscuta* are of considerable importance inasmuch as they are known to attack cultivated plants, often with disastrous results. The most important of these is the Lesser Dodder, *Cuscuta Epithymum,* L., which lives upon various small plants such as Lucerne, Clover, Heath, and Thyme. A variety of this, sometimes regarded as a separate species (*Cuscuta trifolii*), is the Clover Dodder, a serious enemy of Clover and other leguminous crop plants. Another species, *Cuscuta Epilinum,* Weihe., is parasitic upon Flax and Hemp. A third species, the Greater Dodder (*C. europaea,* L.), infests a great variety of plants, including Hops, Vetches, Nettles, Sugar-beet, Potatoes, etc. Several other species also attack crop plants. The Lesser Dodder (*C. Epithymum,* L.) is the common introduced form in South Australia, and is the basis of our description, but this description will apply almost equally well to other species, at least in so far as it deals with the habit of growth and life history of the parasite.

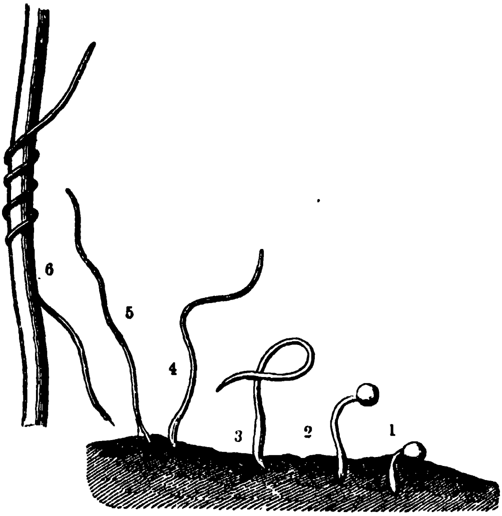
Botanical Name.—The name *Cuscuta* is generally regarded as having been derived from *kechout,* one of the Arabic names for the plant; an alternative derivation is from a Hebrew word meaning "to bend," in allusion to the twining habits of Dodder *Epithymum*, literally "on Thyme," is self-explanatory.

The Family.—The true Dodder belongs to the *Convolvulaceae*, or Morning Glory family, of which it represents a very distinct and specialised subfamily, the *Cuscutoideae,* characterised by holo-parasitism and by structural features connected with this type of habit. The parasitic mode of life is, however, exceptional for the family as a whole, the great majority of *Convolvulaceae* being free-living, though many are climbers and may use other plants for support. The family comprises about 50 genera and 1,000 species, of which 9 genera and 15 species occur in this State in addition to a few introduced forms. Of those growing locally, *Convolvulus, Calystegia,* and some species of Ipomoea, are climbers, the first two being known as "Bindweeds." Of these the "Lesser Bindweed" (*Convolvulus arvensis,* L.) is one of the most troublesome introduced weeds in Australia. In view of the very specialised nature of the Dodders, a consideration of the characters of the family *Convolvulaceae* may conveniently be postponed until we have occasion to deal with a more typical representative such as the Lesser Bindweed. Most members of the family have rather large, tubular, and radially symmetrical flowers, but *Cuscuta* has small flowers crowded in spherical clusters or in spikes. Despite their small size, however, the flowers possess a typically Convolvuloid structure.

The Genus.—The characters of the genus are, of course, those of the subfamily of which it is the sole representative. The plants are quite leafless, even the embryo being devoid of cotyledons or seed leaves, and they consist of slender stems, red or yellowish in colour, and attached by suckers or haustoria to the host plants about which they twine in a spiral manner. The flowers are small, pink or whitish in colour, and borne in lateral clusters. Each consist of a 5-lobed (rarely 4-lobed) calyx and corolla, the latter being tubular and more or less bell-shaped, especially after flowering. The 5 (rarely 4) stamens are attached to the corolla tube which also bears, below the origin of the stamens, a small crown of fringed or toothed scales. The ovary has two styles, and later becomes a more or less globular fruit containing 2-4 seeds. The separation of the genus into

species depends upon such characters as the presence or absence of stalks to the flowers, the diameters and branching of the stems, the size and arrangement of the flowers, and the structure of the floral organs.

Description of C. Epithymum, L.—A reddish-coloured annual with slender branching stems; flowers reddish-white, fragrant, sessile, in globular clusters of 5-10 mm. diameter. Calyx spreading, deeply lobed, the lobes acute, as long as the tube of the corolla; corolla with 5 nerveless pointed lobes as long as the tube; scales fringed and almost closing the tube; stamens exserted but shorter than the corolla; styles distinct; stigmas linear. Period of flowering—Spring-Summer.



(*After Kerner and Oliver.*)

Figure 2.—Greater Dodder (*Cuscuta europaea*). **Stages in germination of seeds.**

Life History.—Dodder infestations are usually traceable to contaminated seed of Lucerne, Clover, etc., and when such seed is sown the resulting crop is soon attacked by the seedling parasites. The seeds of *Cuscuta* are very small, those of the Clover Dodder being usually less than a millimetre in diameter. They are more or less rounded in shape and are of the colour of light dirt. By the use of appropriate sieves they may be separated easily from seed of Lucerne. They germinate readily in damp earth, but usually much later than the seeds of susceptible plants sown at the same time. Thus the host seedlings are usually well advanced by the time the parasite is ready to attack them, as also are the new aerial shoots of herbaceous perennials.

The seed contains a slender spirally coiled embryo imbedded in an endosperm tissue filled with reserve food. When germination begins, the embryo lengthens and twists itself in such a way that one end emerges from the seed as a fine whitish thread which soon turns downwards and enters the soil, becoming somewhat dilated, and attaching itself to soil particles or other objects. The other, much narrower, end turns upwards, elevating the remainder of the seed into the air. At the same time the reserve materials of the endosperm are gradually absorbed by the embryo, which soon discards the seed coat and stores the surplus food in its lower dilated end. The middle region lengthens rapidly so that the embryo becomes a slender thread of which the tip moves slowly round in a circle, so that it may come in contact with a suitable support. Should it do so, the stem makes two or three turns round the support, and the growing point repeats its revolving movement, showing a preference for the living parts of the supporting stem. Wherever it comes into contact with such parts, the stimulus of

contact causes it to make a few close coils, so that the one stem may attach itself by such coils to several branches of the one host, or even to several distinct plants. If, after germination, the seedling parasite fails to make contact with a suitable support, it ceases to grow after it has reached a length of from 1-2 centimetres; but it remains viable in this condition for a long time and may subsequently attach itself to seedlings formed by subsequent germination. In all cases, the primary root soon dies and connection with the ground is lost, the parasite being incapable of nourishing itself once the reserves of the original seed have become exhausted.

The twining habit is of interest because, in Dodder, this character is combined with the same sensitiveness to contact as is possessed by tendrils such as those of a vine. The parasite forms both loose coils and close coils; it twines loosely round a support in the manner of twiners in general, but in places it forms a few close coils, wrapping itself tightly round the host in the same way as a tendril encircles a supporting object. As regards its direction the twining is similar to the thread of a right-handed screw, though an Indian species, parasitic on a fern, has been described in which the direction of twining is the reverse of this.

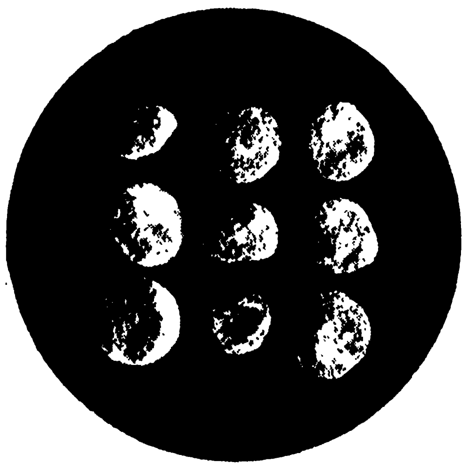
The loose turns are due, as in the case of other twining plants, to the stimulus of gravity acting upon a growing point which normally revolves or *nutates*. The apex of an erect shoot does not grow upwards in a direct line. Invariably it follows a spiral path, moving round in a circle of varying width. In twining plants, not only is this circle much wider than in others, but there is an increased sensitiveness on the part of the growing point to gravitational influence, the actual twining being the result of this stimulus acting upon the sensitive and nutating apex. If the effect of gravity is annulled by rotating such a plant about a horizontal axis, the normally twining stem can be induced to grow in a straight line, and this has been shown by experiment to be true of Dodder as well as of other twiners.

Close coiling round the support is brought about in an entirely different way. The young stem, near its growing point, is sensitive to contact with external objects, and, like a tendril, it bends sharply towards the support when so stimulated. It would seem, however, to be more sensitive in some respects than a tendril, since it is said to reject a dead support, and to be able to discriminate between such and living stems or leaves which are, of course, essential for its nutrition. Contact stimulation causes the parasite to make two or three sharp turns round the stem at this point, and suckers or haustoria are formed where it is in contact with the host stem, the stem of the parasite usually becoming thicker in these situations. The Dodder will not twine on stems greater than a certain diameter, the maximum thickness for most species being about 1 cm., though in the case of Clover Dodder, the supporting stems are usually less than half this thickness.

The haustoria appear as wart-like outgrowths on the side in contact with the host stem. They are situated close together in rows, and, as they grow, become firmly pressed and flattened against the host surface. At first smooth, they subsequently become granular due to a papillose development of their superficial cells. These cells secrete a fluid by means of which the sucker becomes firmly cemented to the surface of the host. When this has been effected, a process, which is the haustorium proper, pushes itself out from the centre of the Dodder stem, traverses the tissues of the sucker, and penetrates the tissues of the host, the penetration being assisted by the solvent action of the fluid secreted by the papillose cells of the sucker. The haustorium pushes its way through the cortical tissues of the host stem and comes to rest in the outer region of the conducting

system. The cells occupying the centre of the haustorium become differentiated to form channels by means of which the conducting systems of both host and parasites are placed in direct communication. It is worthy of note that both food-conducting and water-conducting elements are present in the haustorium of the true Dodder (*Cuscuta*), whereas in the false Dodrer (*Cassytha*) only the latter are found. By this means the Dodder is enabled to share both the water supply and the food supply of the host plant; and since connection with the ground is lost at an early stage, the growth of the parasite takes place wholly at the expense of the food substances so absorbed. The haustoria correspond both in position and mode of development to adventitious roots; thus the parasite consists, apart from its floral organs, simply of the branched twining stem with its haustoria representing modified roots.

The drain upon the host plant is not very heavy during the early stages of growth of the parasite, but it becomes very much more severe towards flowering time when large amounts of nutritive material are withdrawn for the development of flowers and seeds. The flower-heads are very numerous and appear as



(*From N.S.W. Farmers' Handbook.*)
Figure 3.—Seed of Clover Dodder (X 10).

almost perfectly spherical balls, ⅛in.-¼in. in diameter, of a pinkish-white colour. Each ball is a cluster of tiny bell-shaped flowers, each of which may form four seeds. Thus a very large amount of seed may be produced from a single plant of Dodder in flower.

Host Relationships.—Though dependent for all its food materials, Dodder does not confine its attacks to any one particular species, genus, or family of host plants. The lesser Dodder (*C. Epithymum*) is known to parasitise, in addition to Lucerne, many species of Clover, Thyme, Heath, and Furze, and the writer has observed it growing vigorously upon such local plants as Barrel Medic (*Medicago tribuloides*), Wallaby Grass (*Danthonia semiannularis*), Spear Grass (*Stipa variabilis*), Small White Everlasting (*Helipterum corymbiflorum*), Bean Caper (*Zygophyllum glaucescens*), and Ruby Salt Bush (*Enchylaena tomentosa*). Doubtless it grows equally well on many others. The absence of a specifis relationship between host and parasite in this case is in marked contrast with what obtains in the case of many bacterial and fungal parasites, which often show specificity as regards the host plants attacked. The absence of such specificity on the part of Dodder is doubtless to be explained by the fact that it feeds, not upon the

actual living substance of its hosts, but upon the reserve foods in process of being translocated from one part of the plant to another. Just as a standard type of brick may be used in the construction of houses of a great variety of different designs, so the simpler products of food synthesis, such as simple sugars

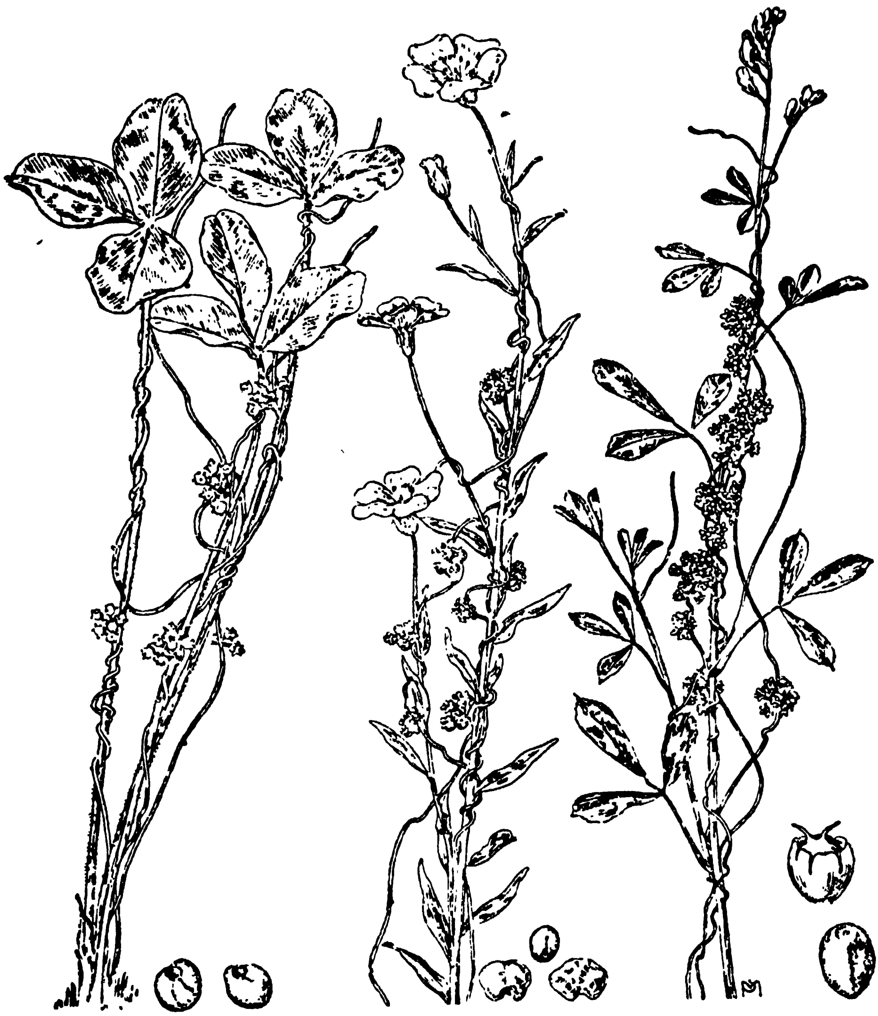


Fig. 4. Fig. 5. Fig. 6.

(*From Michigan Agric. Expt. Stn. Bltn.* 267, "*Michigan Weeds,*" *W. J. Beal.*)

Figure 4.—Field Dodder. *Cuscuta arvensis* Beyrich. A pale yellow, slender, leafless, parasitic vine, branching and spreading, and more or less exhausting plants of red clover or alfalfa (lucerne) and some other herbs. Flowers, small, white, 1.5-2 mm. long. Native in America.

Figure 5.—Flax Dodder. *Cuscuta Epilinum* Weihe. A very slender, pale yellow or red leafless parasitic vine, branching and spreading, and exhausting plants of flax; flowers small, yellowish. Introduced from Europe and troubling flax.

Figure 6.—Lesser Clover Dodder. Thyme Dodder. *Cuscuta Epithymum*, L. An extremely slender, red, leafless, parasitic vine, branching freely and spreading, and more or less exhausting plants of red clover, thyme and a few other plants; flowers white or pinkish Under favourable conditions living near the ground on low plants all winter. Introduced from Europe.

and amino-acids, may be built up into the highly complex molecules of living protoplasm in different ways by different plants. The more subtle differences in the chemical structure of protoplasm between different species, genera, and families, the specificity in the types of protein and higher carbohydrate formed in

DODDER (*Cuscuta Epithymum, L.*)

Growing on Lucerne (*Medicago sativa, L.*) natural size.

A.—Small portion enlarged, stem of parasite bearing suckers and head of flowers.
B.—Single flower. C.—Flower in median vertical section.
D.—Corolla split open showing scales and insertion of stamens.
E.—Floral diagram.

B. C. and D. much enlarged.

their cells, may be accompanied by a comparative uniformity as regards the simpler substances from which the more complex ones are built up, and into which the latter are broken down for purposes of translocation from place to place. Such an uniformity would explain the wide range of host species possible for a parasite which, like Dodder, nourishes itself by sharing the translocation stream of its host. But with intracellular parasites, on the other hand, there may be an actual mingling of the living substance of both organisms, and the intimate relationship so established may involve interchanges of substances of so high an order of chemical complexity, that slight differences in the protein constitution of plants belonging to different families, genera, or even species, may assume the importance of limiting factors for the growth of the parasite concerned. In such cases the parasite becomes greatly restricted as regards the range of host organisms vulnerable to its attack. In the case of hemi-parasites which, like Mistletoe and false Dodder, posses chlorophyll and utilise other plants merely as sources of water and mineral salts, the range of susceptible hosts may be even wider than it is with Dodder.

Control and Eradication.—Dodder-infested plants should never be fed to animals or utilised for the making of hay. There are two reasons for this; in the first place, since the seeds of Dodder pass unharmed through the digestive tract, the droppings of animals afford a medium for the spread of the parasite. A second reason is that, according to Pammell, certain species of *Cuscuta* are poisonous, and, though definite evidence on this point is wanting in the case of *C. Epithymum* and other species attacking Clover and Lucerne, there are on record two cases where serious digestive troubles followed the ingestion, by horses, of hay, which was badly contaminated with Dodder.

The use of clean agricultural seed is always important, but in no case is it more so than in that of Lucerne. Though Dodder is easily detected when present in quantity as an impurity in seed, the presence of only a few seeds to the ounce is to be regarded as a serious contamination, and this small amount may easily escape recognition. Such low percentage impurity is by no means uncommon, since the parasite usually occurs in patches, and when the infested patches are harvested along with the rest of the crop, the percentage of Dodder seed on thorough mixing may be small enough to escape detection, and yet large enough to constitute a serious impurity. It is a matter of great importance, then, to use only such seed of Clover or Lucerne as is certified as being free from Dodder. Dodder seed may be separated easily by using sieves with holes 1¼ mm.-1½ mm. diameter, but there is always a possibility of a few seeds being left behind if the sifting process has not been very thorough indeed. A special method of removing Dodder from other seeds makes use of the fact that the seed coat of the former is relatively rough as compared with that of Lucerne and Clover. The sample is mixed with a fine powder which is sensitive to the attraction of a magnet. This powder clings to the surface of the Dodder seeds, which are also small and light, thus enabling them to be removed by subjecting the sample thus treated to the influence of a series of electromagnets.

Devitalisation by heat is another method of seed treatment which has for its object the lowering of the germination capacity of Dodder without harming the seed of Lucerne. The seed is heated at 65° C. for two hours. This method is analagous to the somewhat similar treatment of Wheat grains for the prevention of Loose Smut, but is of doubtful value.

It is important that Dodder be recognised early when present in a crop. On no account should it be allowed to form seed, and steps should be taken to get rid of it as soon as its presence is discovered. When Dodder patches are found in a Lucerne crop the method of procedure usually recommended is to cut down the affected plants with a scythe as close to the ground as possible, taking care to

cut the crop well beyond the apparent limits of the Dodder, and to remove carefully and burn all affected material. But as there is some danger of dropping this material during removal, where circumstances permit it is probably better, as suggested by Long, to heap the whole together in the centre of the cleared patch, cover with straw or light rubbish, and burn on the spot. When the central heap has been reduced to ashes the whole of the cleared area should be covered with chaff to a depth of several inches and burnt over.

Other methods suggested are the spraying of the infested patches with a 15 per cent. solution of sulphate of iron, or with a solution of sodium arsenite ½lb. in 5galls. of water. The object of these methods is to destroy the Dodder without killing the Lucerne or Clover, and the spray should be applied so as to wet both the plants and the surface of the soil. Where arsenical solutions have been used animals should not be allowed access to the sprayed patches until all traces of poison have been removed by rain or watering.

Dodder seeds remain viable in the soil for five or six years, and so, where a crop has been extensively attacked by the parasite and the latter has been allowed to form seed, such a paddock should not be sown to another susceptible crop for seven or eight years.

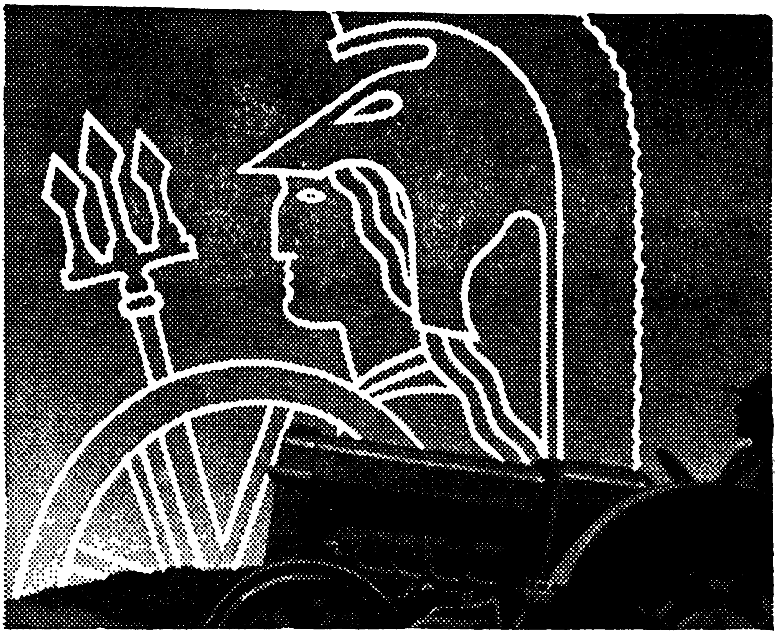
REFERENCES.

1. Campanile, G., *Internat. Rev. Sci. & Pr. Agr.* August, 1922.
2. Farmers' Handbook of N.S.W. Fifth Edition, 1929.
3. Foy, N. R., *N.Z. Journal of Agriculture,* July 1924.
4. Kerner & Oliver, "Natural History of Plants," London, 1894.
5. Long, H. C., "Common Weeds of the Farm and Garden," London, 1910.
6. McLuckie, J., "Studies in Parasitism," *Proc. Linn. Soc. N.S.W.*, XLIX. 2, 1924.
7. Pammell, J., "Manual of Poisonous Plants."
8. Peirce, G. J., "A contribution to the Physiology of the Genus *Cuscuta,*" *Annals of Botany,*" VIII. No. xxix., 1894.
9. Singh, T. C. N., "Case of Cuscuta growing on a Fern," *Annals of Botany,* XLVII., 1933.

SHEEP BLOWFLY.

In a report to the Governing Council of Roseworthy Agricultural College the Principal (Dr. A. R. Callaghan) recently stated that towards the end of January all of the farm flocks were jetted to prevent blowfly strike. The material used was a well known brand of sheep dip at the rate of 1 packet to 40galls. of water. Use was made of the orchard spray pump and the orchard spray gun in place of a jetting gun, at a pressure of 140-150lbs. The jetting did not prevent the fly from striking, but it prevented serious damage from the strike and it saved the work of cleaning up "struck" sheep and the application of a dressing, because the maggots died. Quite a number of sheep lost a little patch of wool about the size of a man's fist, indicating that they had been struck, but in no case were live maggots found and the skin of the sheep was dry and clean, without showing any raw flesh, as is seen when maggots are at work. Further, the sheep did not appear to lose condition as is the case with "struck" sheep. The work could be improved on by the use of a jetting gun instead of a spray gun, because, on examination, the solution had not reached the skin of some of the sheep. A proper jetting gun would be more convenient for the work and would greatly facilitate the operation.

Mr. C. A. Goddard, R.D.A. (Assistant Wool Instructor at the School of Mines), in reply to several requests from country districts for treatment to prevent blowfly strike in sheep, recommends the following preparation and treatment:—Take ½lb. each of white arsenic and washing soda. Boil in 1gall. of water for 20 minutes. This will give a 5 per cent. solution of arsenic. Dilute with 9 parts of water to reduce to .5 per cent. of arsenic. Swab thoroughly to wet skin and wool. Use this as a preventive treatment, and not on badly affected sheep.



CITRUS INDUSTRY.

EXPORT OF ORANGES TO THE UNITED KINGDOM—1935 SEASON.

The attention of shippers of oranges to the United Kingdom is drawn to the undermentioned Federal Regulations in regard to the conditions to be observed in order to participate in the Government Bounty.

1. *Fruit to which Bounty is Applicable.*

The bounty, which is to be paid at the rate of 2s. per export case, shall apply only to the following fruit:—

(*a*) Oranges exported from Australia to the United Kingdom during 1935, with the exception of navel oranges shipped later than 15th July.

(*b*) Oranges of "Special" and "Standard" grades as defined herein.

2. *Picking of Fruit.*

The fruit must be clipped from the trees by means of a blunt-nosed clipper. No protruding stems must be left on the fruit, and where necessary a second cutting, in order to remove superfluous wood, must be made. The fruit must be placed gently, *not dropped,* in the picking box.

3. *Handling of Fruit.*

Throughout the whole of the operations, from the picking of the fruit to the wrapping and packing, *gloves* must be used. *Mis-shapen* or excessively corrugated fruit shall not be shipped.

4. *Pre-cooling.*

Wherever possible all fruit shipped is not to exceed a temperature of 53 degrees at the time of loading, and every effort is to be made to comply with this requirement.

5. *Grading.*

Oranges shall comply with the following provisions:—

(*a*) The outer layers or shown surfaces of the oranges shall be a true indication of the contents of each case.

(*b*) Each case shall contain one variety of oranges only, and the oranges shall be wrapped in paper of a quality approved by the Secretary, Department of Commerce.

(*c*) The oranges in any case shall not vary in size by more than one-quarter of an inch, and no orange shall measure less than two and one-quarter inches in diameter. For the purposes of this paragraph—

"Two and one-quarter inches" shall include fruit of a size two and one-quarter inches or greater diameter, but less than two and a half inches.

"Two and a half inches" shall include fruit of a size two and a half inches or greater diameter, but less than two and three-quarter inches.

"Two and three-quarter inches" shall include fruit of a size two and three-quarter inches or greater diameter, but less than three inches.

"Large" shall include fruit of a size three inches or over in diameter.

(*d*) The oranges shall not be dry. They shall be mature, of normal shape and appearance common to the variety, sound and of reasonably even colour, and shall be packed in either of two grades, namely, "Special" or "Standard."

"Dry," in relation to oranges, means that the proportion of juice extractable is less than 35 per cent. by weight of the whole orange.

"Mature," in relation to oranges packed for export to the United Kingdom, means that the fruit shall be in such condition that the quantity of N/10 soda solution required to neutralize the acidity content of 10 cubic centimetres of juice drawn from the mixed juices of not less than five oranges taken at random from any case or cases bearing a similar mark shall not be more than 30 cubic centimetres.

(*e*) Oranges described as *Special* shall consist of oranges complying with the requirements of paragraph (*d*) above, and in addition shall be substantially free from disfigurements, such as are caused by scars, scratches of the skin, excessive navel segments, cavities, punctures and blemishes caused by any insect or fungus pest. Such disfigurements shall not exceed 2½ per centum of the total surface area of any individual orange.

(*f*) Oranges described as *Standard* shall consist of oranges complying with the requirement of paragraph (*d*) above, but disfigurements such as caused by scars, scratches of the skin, excessive navel segments, cavities, punctures and blemishes due to any fungus or insect pest may be allowed to the extent of 10 per cent. of the total surface area.

(*g*) In order to ascertain the proportion of juice extractable from an orange, the halves of a freshly divided orange shall be rotated upon a conical glass lemon-squeezer under hand pressure only. The resultant juice shall be strained through a strainer of not less than thirty meshes to the lineal inch.

(*h*) Oranges shall not be exported unless they have been sweated prior to packing for a period of at least seven days.

6. *Borax Treatment.*

Fruit intended for shipment to the United Kingdom must not be treated by the borax treatment, as fruit so treated is prohibited importation into the United Kingdom.

7. *Packing.*

Oranges for export into the United Kingdom shall be packed only by Packing Houses—private, proprietary, or co-operative—licensed or approved by the State Departments of Agriculture. The fruit shall be packed in clean, new cases or trays manufactured from seasoned softwood or hardwood containing not more than twenty percentum of moisture, smoothly sawn or dressed in a manner approved by the Secretary, and, in the opinion of the Secretary, sufficiently strong to withstand such handling as is ordinarily incidental to transport to destinations beyond the Commonwealth. Cases manufactured from karri and jarrah timber shall have the boards comprising the ends, tops, and bottoms dressed on one side at least, and the boards comprising the sides shall be smoothly sawn or dressed. The dimensions of the cases shall be as under.

Orange Cases.

Inside measurements (clear of divisions)—

Length	24in.
Depth	11½in.
Width	11½in.

The timber used in the construction of the cases shall be not less than the following dimensions:—

"Orange" Case—

Two ends, one centre, 11/16in. thick, 11½in. wide, 11½in. deep.
Sides and bottoms (six pieces), ¼in. thick, 5¼in. wide, 26 1/16in. long.
Unitised lid (four pieces), 5/32in. thick, 2½in. wide, 26 5/16in. long.
Cleats (two pieces), ¼in. thick, 1¼in. wide, 11½in. long.

The cases shall be wired or strapped at both ends and strapped in the centre.

8. *Loading and Stowage.*

Crates or other approved loading gear must be used for the loading of the fruit at the ship's side.

9. *Marking of Cases.*

The following particulars are to appear in prominent and legible characters on the end or ends of the cases:—

(1) A true description of the fruit (*e.g.*, "Washington Navel Oranges," or "Valencia Oranges," as the case may be).
(2) The word "Australia."
(3) The name or registered brand of the grower or the exporter.
(4) The number of oranges contained in the case.
(5) The grade of the fruit (*e.g.*, "Special" or "Standard," as the case may be).

10. *Payment of Bounty.*

Payment of the bounty may be made either to the grower, packing house, or shipper of the fruit. Where a claim for bounty is made by either the grower or packing house, particulars of each shipment must be furnished together with the name of the firm or company through whom the fruit was shipped. The claim must also be supported by a statutory declaration by either the grower or packer that the conditions prescribed for the picking, handling, grading, and packing of the fruit have been complied with.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow October to April.	Per Herd during April.	Per Cow during April.	Per Cow October to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	28·57	18·97	13,569½	474·95	2,899·44	692·72	24·25	150·55	5·10
5/D ..	30·83	19·13	10,855½	352·11	2,941·44	625·82	20·30	159·05	5·76
5/E ..	34	26·83	13,036	381·74	3,343·54	705·19	20·65	170·54	5·41
5/R ..	69	47·70	16,127½	233·73	2,651·89	744·71	10·79	119·10	4·62
5/Ee .	22	15·83	6,494	295·18	3,601·67	363·41	16·52	182·97	5·60
5/Z ..	30	23·20	20,700½	690·02	4,709·54	1,070·85	35·70	239·46	5·17
5/Ww	20	13·17	8,339½	416·98	2,696·74	382·58	19·13	129·36	4·59
5/Xx	22	5·63	2,083	94·68	2,854·27	115·17	5·24	152·36	5·53
5/Yy	11	6·07	2,604½	236·77	2,650·76	144·83	13·17	133·61	5·56
5/Aaa	17	8·93	3,411	200·64	3,015·12	186·77	10·99	149·28	5·48
5/Bbb	18	9·27	1,740	96·67	2,564·64	94·52	5·25	127·64	5·43
5/Ddd	27·60	25·77	19,107	692·28	5,458·98	899·53	32·59	225·00	4·71
5/Eee	22	18·90	13,113	599·76	4,411·34	601·36	27·46	198·27	4·69
5/Fff	9	·20	30	3·33	2,916·45	1·86	·21	134·47	6·20
5/Ggg	10	8·63	2,765	276·50	3,323·58	146·28	14·63	154·02	5·39
5/Hhh	18·20	16·63	8,332	457·80	4,298·47	351·00	19·29	172·25	4·21
5/Iii .	17·70	14·47	5,390½	304·55	Mar.-April 780·55	327·47	18·50	Mar.-April 45·89	6·07
5/Jjj	21	15·43	11,209½	533·78	Mar.-April 713·99	572·10	27·24	Mar.-April 35·73	5·10
5/Kkk	15	12·90	6,915½	461·03	—	305·28	20·35	—	4·41
5/Aa .	21	16·63	7,196½	342·69	—	321·73	15·32	—	4·47
Means	23·20	16·22	8,651·00	372·97	3,379·18	432·66	18·65	162·55	5·00

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow July to April.	Per Herd during April.	Per Cow during April.	Per Cow July to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	10·60	10·60	6,219	586·69	4,990·20	295·72	27·90	238·82	4·76
7/L ..	33	26·67	10,220	309·70	4,987·96	471·48	14·29	221·18	4·61
7/P ..	27	25·47	15,869	587·74	5,560·50	738·04	27·33	265·54	4·65
7/Aa .	25	11·83	3,628½	145·14	4,647·75	171·40	6·86	212·55	4·72
7/Tt .	17	15	7,305	429·71	6,464·47	319·73	18·81	282·32	4·38
7/Uu	29	7·43	2,653	91·48	3,626·95	103·38	3·56	155·03	3·90
7/Xx.	23	18	9,630	418·69	5,841·95	521·57	22·68	313·13	5·42
7/Bbb	76	63·67	26,934	354·39	5,027·80	1,212·25	15·95	222·94	4·50
7/Ccc	25	21	9,795	391·80	4,708·32	391·48	15·66	202·95	4·00
7/Ddd	13	10·93	6,444	495·69	5,637·40	308·72	23·75	270·55	4·79
7/Eee	11	8·10	5,074½	461·31	5,346·70	241·11	21·92	268·46	4·75
7/Ggg	17	12	4,206	247·90	3,278·22	179·48	10·58	148·47	4·26
7/Hhh	12	9·33	3,005	250·41	5,613·59	106·89	8·91	196·48	3·56
7/Iii .	16	13	6,660	416·25	6,144·34	214·19	13·39	214·55	3·22
7/Jjj	12	8·67	3,332½	277·58	3,606·35	136·37	11·36	169·90	4·10
7/Kkk	30	19·53	7,101	236·70	4,549·36	356·90	11·90	228·40	5·03
7/Lll	17·83	14·83	7,722½	433·12	5,472·62	406·08	22·77	291·74	5·26
7/Mmm	15	13·83	6,850	456·66	4,354·36	359·04	23·94	225·42	5·24
Means	22·75	17·22	7,924·94	348·41	4,924·33	362·99	15·96	226·11	4·58

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1935

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow March to April.	Per Herd during April.	Per Cow during April.	Per Cow March to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	30	23·33	9,797	325·97	712·27	518·89	17·30	35·72	5·31
9/C ..	11·70	9·80	4,773½	407·08	884·74	200·71	17·15	37·34	4·20
9/D ..	31	27	15,075	486·29	994·33	816·28	26·33	52·05	5·41
9/E ..	12	12	5,430	452·50	935·58	278·38	23·20	44·90	5·13
9/F ..	16	10·83	5,073	317·06	559·65	263·59	16·47	27·61	5·20
9/G ..	27	25·10	11,364	420·89	940·85	607·79	22·51	48·35	5·33
9/I ..	30	20·47	8,756½	291·88	485·26	423·80	14·13	23·62	4·84
9/J...	21	12·17	5,615	267·38	480·61	244·77	11·66	20·49	4·36
9/L ..	28·13	14·53	7,856½	279·29	474·11	350·96	12·48	20·62	4·47
9/O ..	23·03	18·03	8,474½	367·92	756·18	391·59	17·00	33·87	4·62
9/P ..	45·20	18·03	7,633	168·87	227·40	401·62	8·89	12·12	5·26
9/T ..	19·60	11·70	5,135½	262·01	481·28	237·26	12·10	21·99	4·62
9/W .	28	22·77	13,801	492·89	884·22	552·09	19·72	35·44	4·00
9/X .	9	7·13	2,953	328·11	623·84	151·83	16·87	31·72	5·14
9/Y ..	11	7·10	3,775½	343·22	670·11	161·90	14·72	28·00	4·28
9/Z ..	10	7·97	2,874½	287·45	542·13	136·56	13·66	25·75	4·75
9/AA .	16	13·93	7,045	440·31	631·77	391·73	24·48	34·40	5·56
9/BB .	24	23	7,695	320·62	—	395·33	16·47	—	5·14
9/CC .	19	10·97	5,169	272·05	—	263·01	13·84	—	5·09
9/FF .	20	All	cows dry						
9/EE .	40	22·93	7,585	189·63	—	379·80	9·50	—	5·01
9/DD	17	14·20	3,660	215·29	—	177·97	10·47	—	4·86
Means	22·21	15·14	6,796·52	305·98	607·83	333·90	15·03	29·14	4·91

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow December to April.	Per Herd during April.	Per Cow during April.	Per Cow December to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18	4·37	1,197½	66·53	1,074·33	66·95	3·72	58·27	5·59
6/C ..	17	10·37	5,293	311·35	2,231·95	221·43	13·02	96·60	4·18
6/Y ..	13	11·33	4,915	378·07	2,259·74	209·73	16·13	95·03	4·27
6/FF .	27·40	23·87	13,703	500·10	3,459·60	609·25	22·24	145·09	4·45
6/II ..	19·43	18·43	14,794½	765·66	3,467·88	610·13	31·54	144·31	4·17
6/KK	20	16·27	7,177	358·85	2,432·03	293·88	14·69	92·43	4·09
6/LL .	25	19·17	11,039½	441·58	2,759·48	442·67	17·71	102·89	4·06
6/OO .	20·83	17·83	11,492½	551·72	3,269·57	499·90	24·00	138·97	4·35
6/SS .	19·27	18·60	12,346	640·69	3,808·65	512·20	26·58	148·50	4·15
6/TT .	22·87	21·13	13,674	597·90	3,414·32	598·01	26·15	141·89	4·37
6/VV .	25·73	24	15,698	610·10	3,603·92	767·07	29·81	165·61	4·89
6/XX	26·73	26·33	15,518	580·55	3,533·00	632·63	23·67	143·84	4·08
6/CCC	25·03	20·57	9,552½	381·64	2,325·40	424·87	16·97	102·07	4·45
6/DDD	25·90	20·17	10,896½	420·71	2,710·33	474·40	18·32	120·60	4·35
6/JJJ	26	20·50	14,628	562·61	3,177·14	687·40	26·44	148·97	4·70
6/NNN	36·43	31·13	14,485	397·61	2,932·75	687·25	18·86	129·77	4·74
6/MMM	5·57	5·57	4,724	848·11	3,418·23	221·35	39·74	150·16	4·69
Means	22·01	18·21	1,065·49	484·07	2,961·55	468·18	21·27	126·44	4·39

STATE OF SOUTH AUSTRALIA.

FINAL RESULTS OF CEREAL AND HAY HARVEST, 1934-35.

[A. W. BOWDEN, Acting Government Statist.]

WHEAT.—1934-35—27,455,600bush. Average per acre, 8.61bush.
WHEAT.—1933-34—35,373,466bush. Average per acre, 9.26bush.

There are still a few minor wheat districts where the completion of the collection has been delayed and a number of odd returns from farmers in other districts outstanding but, rather than further delay the final results, a safe estimate has been made for all these and hence the totals now submitted may be accepted as final.

SURVEY OF CONDITIONS.

It will be remembered that the official estimate of the wheat crop published in December, 1934, was 29,000,000bush. This forecast was based on reports received during the first week in December and the indications were that the crop would prove to be more favourable than had been previously anticipated. Subsequent harvesting weather in some of the more important districts proved to be particularly unfavourable, and a large proportion of the decrease from the December forecast of 29,000,000bush. to the final result now published (27,455,600) must be attributed to this factor.

When the Chamber of Commerce fixed the f.a.q. standard for South Australian wheat at 60½lbs. the Chairman (Mr. H. E. Annells) said that before the new year, the samples at that time proved to be of a higher natural weight than the samples submitted when the f.a.q. standard was fixed on 31st January. This was due to the weather during the last week in the year when rain fell continuously while the grain was ripe but had not been harvested. The result was that the grain became bleached and there was a loss in natural weight. This feature is definitely borne out by the reports of the various Agricultural Inspectors with reference to harvesting conditions in late December and early in the new year.

Considering the above factor and also the severe grasshopper plague, the yield must be considered satisfactory. Compared with the December estimate, the Barley yield was 5,603,014 (5,500,000bush.); Oats, 2,412,117 (2,750,000bush.); Hay, 550,020 (538,500) tons.

GROWERS AND ACREAGE SOWN.

Wheat Growers.—There were 14,392 (14,943) growers of wheat for all purposes for the season 1934-35, and of this number 13,145 (13,919) reaped areas for grain. Approximately 1,828 (1,712) reaped areas of under 50 acres. Share farmers counted once only.

Acreage.—The grand total acreage sown to wheat, barley and oats for all purposes was 4,497,481 (4,949,349) acres, a decrease on the previous year of 451,868 acres.

Wheat.—3,459,380 (4,074,417) acres; grain, 3,188,225 (3,821,795) acres; hay, 264,373 (246,999); fed off, &c., 6,782 (5,623).

Barley.—334,462 (320,527) acres;grain, 316,807 (307,423); hay, 3,128 (2,729); and fed off, 14,527 (10,375).

Oats.—703,639 (554,405); grain, 367,192 (265,074); hay, 280,710 (247,879); fed off, etc., 55,737 (41,452).

PRODUCTION AND AVERAGES PER ACRE.

Wheat.—27,455,600 (35,373,466) bushels, decrease, 7,917,866 bushels—averaging 8.61 (9.26) bushels per acre.

Barley.—5,603,014 (5,254,280) bushels, increase 348,734 bushels averaging 17.69 (17.09) bushels per acre. This yield has only been exceeded by the crop of 6,070,161 bushels in 1932-33.

Oats.—2,412,117 (2,087,772) bushels, increase 324,345 bushels, averaging 6.57 (7.88) bushels per acre. This was a record crop.

Hay (wheaten, oaten and barley).—550,020 (524,191) tons, increase 25,829 tons, averaging 1.00 (1.05) tons per acre. Distributed as follows—Wheaten, 298,896 (290,009); Oaten, 247,603 (231,607); Barley, 3,521 (2,575) tons.

BENEFITS FROM FALLOWING.

The following return illustrates the benefit from cropping wheat on fallowed land:—

Grown on	Wheat Yield per Acre.				
	1934-35.	1933-34.	1932-33.	1931-32.	1930-31.
	Bush.	Bush.	Bush.	Bush.	Bush.
Fallow	11·02	11·60	12·86	14·81	11·05
Not fallowed	2·98	4·78	6·86	7·57	5·48
Total	8·61	9·26	10·43	11·81	8·34
	Inches.	Inches.	Inches.	Inches.	Inches.
Rainfall.—April-Nov.	12·15	12·15	14·70	13·27	11·31

Of last season's wheat crop, 2,233,258 (2,508,581) acres sown on fallow yielded 24,608,163 (29,092,873) bushels, averaging 11.02 (11.60) bushels per acre and 954,967 (1,313,214) acres sown on unfallowed land yielded 2,847,437 (6,280,593) bushels averaging only 2.98 (4.78) bushels per acre thus making the State average 8.61 (9.26) bushels per acre.

RAINFALL.

The mean monthly rainfall over the agricultural areas of the State is specially computed and recorded in comparison with the averages for the past 30 years. The following are particulars in inches of the rainfall from April to November for the chief Divisions of the State.

Year.	Whole State.	Central.	Lower North.	Upper North.	South-East.	Western	Murray Mallee.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Rainfall—							
1934	12·15	15·66	12·12	8·67	19·27	10·12	10·36
1933	12·15	14·62	11·32	8·05	19·26	11·71	8·47
Average, five years	12·72	16·05	12·29	8·82	19·01	11·54	10·31
Average, 30 years	12·73	16·13	12·37	9·02	19·50	11·14	10·52
Wheat Yield—	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
1934	8·61	13·17	14·49	7·44	19·61	4·25	4·92
1933	9·26	13·85	14·79	6·61	16·14	6·21	5·42
Average, five years	9·74	13·98	14·73	8·13	13·90	6·28	7·05

THE MARKETING OF THE CROP.

The carry forward was 8,150,000 bushels, and with the 1934-35 crop a total of 35,605,600 bushels was available. 3,250,000 bushels are required for seed and probably 4,250,000 bushels for home consumption, including feed for stock and a three mouths' supply carry forward before the next crop is matured; less this 7½ million, the balance available for export was 28,100,000. To date of this Bulletin, it is estimated that 20,300,000 has been exported leaving a balance available for shipping of 7,800,000.

FIVE MONTHS OVERSEA EXPORTS.

(December 1934, to April 1935.) The principal countries to which cereals have been exported this season compared with last season is as follows:—*Wheat* (bushels).—United Kingdom, 8,397,403 (5,802,580); China, 3,594,793 (—); Japan, 3,459,142 (1,138,863). *Flour* (tons).—United Kingdom, 7,857 (12,427); Japan, 8,060 (3,244); Egypt, 6,697 (5,023). *Barley* (bushels).—United Kingdom, 362,586 (1,145,470); Belgium, 1,107,562 (118,868); New Zealand, 264,028 (144,180); Japan, 44,636 (253,422).

AREA INTENDED TO BE CROPPED, 1935-36.

Particulars have been received from farmers in all hundreds of the State as to the areas intended to be sown for the 1935-36 season. These indicate that the wheat areas for all purposes will be decreased by approximately five per cent. and the barley and oaten areas increased. Further information will be obtained after seeding.

ACREAGE CROPPED.

Divisions.	Total Wheat, Barley, Oats.	Grain. Wheat.	Barley.	Oats.	Hay (W.B.O.).	Fed off Areas (W.B.O.).
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Central	927,012	491,110	216,185	35,038	170,317	14,362
Lower North	987,249	751,994	63,340	31,458	118,304	22,153
Upper North	334,077	305,674	1,355	3,136	22,515	1,397
South-Eastern	91,346	25,646	8,905	22,613	31,224	2,958
Western	1,212,889	926,896	13,668	173,404	86,531	12,390
Murray Mallee	944,908	686,905	13,354	101,543	119,320	23,786
Total, 1934-35 ..	4,497,481	3,188,225	316,807	367,192	548,211	77,046
Total, 1933-34 ..	4,949,349	3,821,795	307,423	265,074	497,607	57,450
Increase or decrease .	−451,868	−633,570	9,384	102,118	50,604	19,596

PRODUCTION OF GRAIN AND HAY.

Divisions.	Grain. Wheat.		Barley.		Oats.		Hay (W.B.O.).
	Bush.	Av.	Bush.	Av.	Bush.	Av.	Tons.
Central	6,465,624	13·17	4,106,052	18·99	494,457	14·11	244,441
Lower North	10,895,686	14·49	906,364	14·31	387,167	12·31	127,628
Upper North	2,272,728	7·44	11,642	8·59	34,241	10·92	24,702
South-Eastern....	502,862	19·61	242,663	27·25	488,043	21·58	43,827
Western	3,940,715	4·25	193,505	14·16	485,560	2·80	54,737
Murray Mallee ...	3,377,985	4·92	142,788	10·69	522,649	5·15	74,685
Total, 1934-35	27,455,600	8·61	5,603,014	17·69	2,412,117	6·57	550,020
Total, 1933-34	35,373,466	9·26	5,254,280	17·09	2,087,772	7·88	524,191
Increase or decrease	−7,917,866	−0·65	348,734	0·60	324,345	−1·31	25,829

FIVE YEARS' COMPARISON.

Year.	Wheat. Area.	Yield.	Average Per Acre.	Rainfall Agric. April-Nov.	Value of Oversea Exports. Wheat and Flour.	Barley.
	Acres.	Bush.	Bush.	Inches.	£	£
1929-30	3,645,764	23,345,093	6·40	9·57	3,866,967	77,660
1930-31	4,180,513	34,871,526	8·34	11·31	3,037,811	342,732
1931-32	4,071,370	48,093,102	11·81	13·27	5,901,673	413,034
1932-33	4,066,782	42,429,614	10·43	14·70	5,225,173	319,877
1933-34	3,821,795	35,373,466	9·26	12·15	2,731,285	294,071
Mean	3,957,245	36,822,560	9·31	12·20	4,152,582	289,475
1934-35	3,188,225	27,455,600	8·61	12·15	3,670,097 10 months	343,355 10 months

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

WOMEN'S BRANCHES.

A REVIEW OF THEIR PROGRESS.

[By FRED RICHARDS, Assistant General Secretary Agricultural Bureau.]

As the outcome of a recommendation made by a Sub-Committee of the Advisory Board of Agriculture in 1917, the Government approved of the formation of Women's Branches of the Agricultural Bureau, and the time appears to be opportune to review the progress of their work in view of the fact that the membership now exceeds 1,000 members.

The following table shows a list of Branches, together with the date of formation, number of members, and the name and address of the Secretary:—

Branch.	Date of Formation.	Number of Members.	Name and Address of Secretary.
Riverton	14/11/1917	27	Mrs. E. A. Gray, Riverton
Williamstown	8/2/1921	7	Mrs. A. Cundy, Williamstown
Saddleworth	21/7/1921	12	Miss G. Frost, Saddleworth
Kalangadoo	11/7/1923	18	Mrs. H. Brooks, Kalangadoo
Pinnaroo	7/11/1923	43	Mrs. P. Dowd (President)
Wilkawatt	17/7/1924	16	Mrs. W. Pritchard, Wilkawatt
Kangarilla	12/5/1926	8	Mrs. M. Steer, Kangarilla
Wasleys	31/10/1928	25	Miss J. Braun, Wasleys
Belalie	27/2/1929	47	Mrs. E. Orchard, Jamestown
Gladstone	29/5/1929	28	Mrs. L. Sargent, Gladstone
Eurelia	28/8/1929	18	Miss M. Stott, Eurelia
Auburn	28/8/1929	26	Miss L. Dennison, Auburn
Goode	28/8/1929	7	Mrs. P. Lange, Goode, *via* Ceduna.
Wirrilla	27/11/1929	20	Mrs. W. R. Jones, Auburn
Parilla Well	21/9/1930	25	Mrs. J. Johnson, Pinnaroo
Nelshaby	30/4/1930	17	Miss T. Franks, Nelshaby
Millicent	28/5/1930	16	Mrs. H. Hutchesson, Millicent
Parilla	30/7/1930	30	Mrs. A. Welden, Parilla
Warcowie	27/9/1930	9	Miss L. Martin, Hawker
Parrakie	29/10/1930	10	Miss J. Halliday, Parrakie
Penola	24/6/1931	59	Mrs. F. Kidman, Penola
Tantanoola	28/10/1931	16	Mrs. E. Telfer, Tantanoola
Clare	25/11/1931	38	Mrs. A. Pollock, Clare
Yurgo	27/1/1932	11	Mrs. Sanders, Yurgo
McLaren Flat	30/3/1932	29	Mrs. B. Powell, McLaren Flat
Warramboo	27/4/1932	16	Mrs. A. Steer, Warramboo
Balumbah	27/7/1932	16	Miss H. Jericho, Balumbah
Pygery	31/8/1932	14	Mrs. J. Heylen, Pygery
Mangalo	31/8/1932	13	Mrs. F. Coles, Mangalo
Rendelsham	30/11/1932	15	Mrs. Z. Bignell, Rendelsham
Coonawarra	30/11/1932	32	Mrs. F. Skinner, Coonawarra
Mundalla	25/1/1933	22	Miss M. Fisher, Mundalla
Kybybolite	22/2/1933	36	Mrs. W. Kekwick, Kybybolite
Morchard	31/5/1933	17	Mrs. C. Schulz, Morchard
Laura Bay	28/6/1933	21	Mrs. R. Burke, Ceduna
Taplan	28/6/1933	29	Mrs. W. Flynn, Taplan
O'Loughlin	25/8/1933	14	Mrs. A. Pfeiffer, Ceduna
Wepowie	25/8/1933	14	Miss E. Roocke, Wepowie
Balhannah	24/10/1933	25	Miss D. Spoehr, Balhannah
Hope Forest & Dingabledinga	31/1/1934	27	Mrs. L. Fincher, Hope Forest
Snowtown	26/4/1934	40	Mrs. A. Hocking, Snowtown
Wirrabara	26/9/1934	31	Mrs. A. Curtis, Wirrabara
Wilmington	26/9/1934	32	Mrs. P. Cole, Wilmington
Sheoak Log	26/9/1934	37	Miss K. Koch, Sheoak Log
Monarto South	26/9/1934	23	Mrs. F. Liebelt, Monarto South
Boor's Plains	28/11/1934	21	Miss L. Stanway, Boor's Plains, *via* Kadina
Tweedvale	27/3/1935	15	Miss W. Schapel, Tweedvale
Narridy	24/4/1935	31	Miss B. Reynolds, Narridy
Coonalpyn	29/5/1935	17	Miss C. George, Coonalpyn
Karte	26/6/1935	28	Mrs. F. Atze, Karte

A total of 50 Branches with a membership of 1,108.

An examination of this table will show that during the period covering the years 1917 to 1926, inclusive (10 years) only eight Branches were formed; in the next 8½ years (1927 to June, 1935), an additional 42 Branches had been approved by the Board.

It is particularly gratifying that, in every instance but one, regular meetings with good attendances are reported. It is also worthy of note that at several centres the formation of a Women's Branch has been the means of reviving Men's Branches that were in danger of being closed.

Perhaps the outstanding feature is the success that has accompanied the Branches that have been formed in the larger country towns, such as Pinnaroo, Jamestown, Gladstone, Millicent, Penola, and Clare. In more than one quarter the opinion was frankly expressed that with the large number of social activities and other women's organisations already in existence, the Bureau would be looked upon more or less in the light of a new toy, that would perhaps be regarded for a few months as a novelty and then gradually cease to function. That the reverse has been the case is borne out by the Annual Reports of the Secretaries, and it is not unusual for them to record a year's work, during which 12 meetings and sometimes more have been held, with an average attendance of between 40 and 50 members and visitors.

There is not the slightest doubt that an active Women's Agricultural Bureau is an acquisition to any rural district and the General Secretary, c/o the Department of Agriculture, will welcome inquiries concerning the formation of a Branch in any district of the State.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

DAIRY CONFERENCE.

Despite a rather disappointing attendance at the Annual Dairy Conference held at Mount Barker on May 9th, the general opinion of those who attended was that the Conference was of a very instructive nature, particularly so far as the discussions which followed the reading of the papers was concerned. Mr. E. A. Hunt, Chairman of the Mount Barker Branch, presided, delegates being present from Auburn, Saddleworth, Lyndoch, Adelaide, Jervois, Longwood, Ironbank, Hartley, Mount Compass, Milang, and Mount Barker. Messrs. P. J. Baily and F. Coleman (Members Advisory Board of Agriculture), H. B. Barlow, H.D.A. (Chief Dairy Instructor), R. C. Scott, R.D.A. (Supervisor of Experimental Work), R. Hill, R.D.A., P. H. Suter, D.D.A., H. J. Apps (District Instructors), H. C. Pritchard (General Secretary Agricultural Bureau), and F. C. Richards (Assistant Secretary), attended on behalf of the Department of Agriculture. Mr. P. J. Baily delivered the opening address. The following papers were read and discussed:—"Some Dairy Home Truths," J. Hudd (Adelaide); "The Powers of the Federal and State Government with regard to Interstate Trade," J. Yelland (Milang); "The Development of the Dairy Industry in Denmark," L. M. Hansen (Mount Barker). The following resolutions were carried:—"That the 1936 Conference be held at Strathalbyn"; "That the Government be asked to establish a fund from a levy taken on the sale of all pigs to compensate for all pigs condemned"; "That a fund be organised for compensation for tuberculosis and pleuro-pneumonia for dairy cattle up to two-thirds of market value"; "That we view with grave concern the serious effect margarine and all butter substitutes are having on the dairying industry, and that we urge both Federal and State Government to take immediate action to enforce at least 6d. per lb. levy on all butter substitutes manufactured in competition with dairy butter." Mr. P. Wise, of Mount Barker, capably carried out the secretarial duties of the Conference.

The Conference concluded with a social, at which delegates and visitors were entertained by the Mount Barker Branch.

PAPERS READ AT CONFERENCES.

(*Continued from page* 1271.)

THE FALL IN WHEAT.

[L. R. ROBINS, Saddleworth.]

Probably very few farmers in the State to-day need to be told that there has been a fall in wheat prices! Need they be told also that the wheat has fallen from grace on account of a falling-off in quality? The causes of the fall in price are many, including the carrying over of supplies until the accumulation is more than burdensome; the policy of encouraging home-grown wheats where the country is usually a big importer; fiscal problems and financial difficulties; and one fact not to be overlooked in South Australia is that with the lower quality wheats the demand has further fallen off, and the price is undoubtedly lower.

At a time when business is low we should cultivate every demand for our goods. We must create further demands for our wheat. Quite recently a deputation of British millers requested Canada to send *more* hard wheats. We all wish that they would ask Australia for more! Why do they not? The fact is that our wheats at one time held a name for colour and "blending quality." The demand for colour is not so insistent now, because it can be overcome more or less by artificial means, and it is met by the flood of weaker, softer wheats grown nearer home—which wheats have also come into competition with ours in blending, so that whereas a few years ago our wheats demanded a premium, now they are not wanted to the same extent, and the price has sagged considerably. This is a vitally important fact which is realised by those who in any way control the breeding, the production, and the marketing of Australian wheat, and it is one which vitally affects every farmer.

Owing to past methods of breeding and marketing our wheats, the struggle has been for quantity, and quality has been neglected, and this position has been accentuated by the present economic depression. But the time has come when every farmer should take a longer view, or we will be faced with the extreme difficulty of regaining lost markets. With concerted action in the direction of improving quality, not only should the price rise, but the demand for our wheats should increase and there should be a readier sale.

How is it that our wheats have deteriorated, and what does that mean? Except for a very small percentage of wheat which goes for feed for birds and animals, the great bulk of wheat is put on the market with the ultimate objective of making bread—and yet authorities are now openly saying that some wheats yield flours which are admirably suited for making high quality bread, whilst others are quite unsuitable for this purpose.

In the course of a brief discourse it is not possible to give details of how wheat is turned into flour, and how that is turned into bread, but the following short outline will show where the present-day wheats are largely failing. In the first place, wheat is a berry. It contains a starchy centre enclosed in a skin. That skin represents the bran and pollard. The centre of the berry consists of starch, sugar, and protein material. This centre becomes the flour in milling. Of this flour, about 90 per cent. is starch which forms the bulk of the loaf; the sugar assists the fermentation which causes the release of gas and makes the dough rise, with the consequent bulk of the loaf; and last, but most important of all, the protein material gives rise to *gluten* in the dough which holds the loaf together and gives it the texure and crumb.

This is the overshadowing property in baking at the present time. Gallipoli has been milled with as low as 4 per cent. gluten content, whereas many other wheats show 10 per cent. Besides this, the quality of the gluten is very poor in that variety. The complaints against the serious lack of quality gluten in present wheats are not confined to the home consumption of flour and wheat, but very strong representations have been made from overseas for stronger consistent flours. Just at the present time the demand from the Orient is the salvation of local wheat prices, and there is quite a good export trade in flour being built up. But the ever-increasing demand is for

stronger flours, which must of necessity compete with the United States of America and Canada, who have flours with high gluten content. We are placed next door to these potential markets, and if we can meet the requirements we hope to get the orders; but quality must count, and the organisation of other countries is carried to far greater limits than we can hope to attain. Besides this, modern transport has made it easier to carry goods quickly and easily to greater distances—it has brought markets nearer to those further away, if only they have the goods to supply, and if we cannot meet the demand while it is there, others would do so. Argentino has already standardised their wheats and thrown out the very weak ones. Even Egypt, who years ago had to be satisfied very often with very poor quality flour, has now legislated for a 12 per cent. gluten. This has since been lifted, but it shows the unmistakable trend.

Some of our wheats almost consistently give low test figures. Soil and climate may alter the quantity of gluten in many cases, but generally speaking, the hereditary constitution of any variety chiefly governs the quality, so that by growing an approved variety this should tend to check the drift in quality.

It should be pointed out that a weak wheat is not only unsuitable for milling for bread by itself, but when it is blended with a hard wheat to build up the strength the astounding position is that the weak wheat pulls down the strength of the blend much more than would be expected. For instance, I quote a test made by the Roseworthy College, where a 50-50 blend was made with Carrabin (test figure 121) and Waratah (test figure 30). The average of these figures would be about 76, but in actual practice the blend gives a test figure of 49. This means that through using Waratah a miller would have to use a similar quantity of Carrabin, if he had these two wheats, in order to build up his flour to a strength which would be marketable. From tests made it appears that this position is not so bad where the weaker wheat has a reasonable strength and is not of such a low figure—that is, a soft wheat which has a moderate test figure does not lower the figure of a hard wheat, when blended, in such an astounding proportion as in the case given above. This should show the magnified danger of growing a very weak wheat.

How to Improve the Quality.

We have a somewhat reassuring possibility of being able to improve strains in many varieties which are already grown, resulting in a better wheat with practically the same yield. Unfortunately it takes eight years to fix a new variety, so that except for new wheats which are already being fixed, we cannot look for a very quick alteration from that direction. However, Roseworthy College has some very promising strains tested over three years, while New South Wales came earlier into the field, and besides releasing Dundee with a splendid reputation for yielding and milling, they expect to have some more lines to put out in the next few years. We all hope that the efforts of wheat breeders will be the means of getting us out of the wood, and we can look forward in the immediate future to raising the standard by increased sowings of such wheats as Dundee and Carrabin.

In the meantime, we cannot too strongly recommend all farmers to grow a percentage of "hard" wheats, and to drop the very weak ones and replace with others which, if only of moderate quality, give a reasonable yield and do not reduce the standard below its present low level. We do not want an indiscriminate sowing of any one particular variety, because the farmer must try and find out a suitable wheat for his district, and if he has no experience of growing hard wheats in his district he should grow a percentage first. But for goodness sake grow *some* good wheat, because you must all realise that it is ultimately going into bread, and the demand for quality is still growing, while the competition in marketing wheat is likely to be even more keen.

There has been quite a number of artices published in agricultural journals and other papers on this subject, and it should not be necessary to stress the position any further. We are fortunate in having men in the Agricultural Colleges who have foresight and ability, and a desire to improve the standard to which our wheats have fallen. They

[*Papers Read at Conferences.*]

are working arduously to select strains within varieties, to maintain or increase the yield, and to bring out new wheats which will meet with success from both the farmers' and millers' points of view. Roseworthy College has already tested over 5,000 crossbred strains, and they have some 10,000 more tests to do yet. The magnitude of the work shows that they are fully seized with the importance of the results, and I urge every farmer not only to make an endeavour himself to follow this lead, but to impress the position on all farmers in his district. The work of our Colleges can only meet with full benefit if the farmer in his turn takes a hand in the matter.

A deficiency of sugar in wheat can be remedied, but millers cannot put gluten into flour if it is not in the wheat.

MANAGEMENT AND CARE OF THE FARM TEAM.

[R. H. EIME, Blyth.]

The mainstay of almost every farm is its team of horses, and with a little care and good management in the way they are fed, in the stable, in the team, in the manner they are trained or broken in, and the attendance to their general health, they can be a team of good appearance and temperament, and be admired by many a passer-by.

STABLING AND GROOMING.

The stabling of the team is to be considered. It must provide good shelter and at the same time be well ventilated. A stable with an open front facing the south is preferable. The situation should be such as to allow of good drainage from the stable and also the yard, a badly drained stable and a boggy yard being a menace to the health of its occupants. The managing of the horses in the stable is made easy if every horse has its particular place, and is tied up—especially for the morning and midday feeds. The practice of tying up is by far the best, and has many advantages over other systems. Every horse learns to know its place, and will go to it at a word from its master. This system also has the advantage that every horse will get its share of feed, and not be bossed from one end of the stable to the other by one or two unruly horses. The harness can be hung on a peg at each horse's place, and saves the necessity for running around the yard with a pair of winkers for a particular horse, or leading them to the harness-room. Not only does this method save one's own energy, but it teaches the horses to be quiet. Each horse should be thoroughly brushed and groomed before going to work; do not brush just the shoulders alone, go all over the animal, removing any sweat from the previous day. The little extra time involved is made worth while. It enhances the coat and helps to prevent them from rubbing one against the other in the team. When grooming, always speak to the horse before touching him; it may save you getting many a nasty kick—no matter how well horses are trained they do not like another horse interfering when they are feeding or resting, and the horse, feeling you touch him without speaking, may kick without realising it is not another horse. A straw stack near the stable may save a great deal of time when grooming, but do not let the straw stack do it all. A straw stack can also provide some shelter and warmth of a winter night.

The position of the water trough needs consideration. On no account should it be in the stable yard. It should be at least 2 or 3 chains away, situated where the horses pass it going to most of the paddocks. The advantage of having the trough as far away as it may seem is that the horses will not reach the trough with a mouthful of feed, as would be the case if it were in the yard. The dropping of food in the water is most objectionable and quickly contaminates the water, which may give rise to many stock ailments, especially if the trough is never allowed to become empty, as is the case with an automatic ball tap.

FEEDING.

The appearance and condition of the team depends very largely on the way they are fed, the amount given them, the time allowed for eating, and the quality of the feed. Always allow them time to eat first—1 hour at the morning and midday meal. A good measure for chaff is an old carbide tin; this is sufficient for two horses for one feed. At the evening feed they may be given three parts of a bin each, and overnight a bin

to four horses, plus a sheave of hay each, or if a paddock of greenfeed is available, they may be turned out over night; but always give a good feed of chaff before doing so if the horses are to work next day.

To the rations of chaff I have mentioned crushed grain—never whole grain—may be added, the amount depending upon the quantity of grain in the chaff and the work the horses are doing. Of crushed grains, I prefer barley, but oats are cheaper, and a crop of oats is advantageous to the land and at the same time provides grain for the team. For horses doing heavy work, such as seeding and ploughing, and fed on fair quality chaff, a half kerosene tin of crushed grain per horse per day can be fed with safety. The chaff fed should always be wholesome; it is not worth while to risk feeding that little bit of chaff that may have become hot through dampness, or even to risk putting an occasional mouldy or mousey sheaf through the cutter when chaffing: the result may be the loss of a horse or an ailing horse for a day or so.

GENERAL MANAGEMENT.

In the team careful management must be exercised. Have the team arranged so that it is easily handled, do not work more than nine horses abreast, except when harrowing, but for a team above that number use a tandem pull, and most certainly use the roller and chain type of equaliser. Be careful not to overload the horses. It is far better to put in an extra horse or two and have them walk along, than have the team straining. If a horse is inclined to be fast do not penalise him by tying his swingletree back to the main spreader or the implement, but give him a longer pair of chains. On the other hand, should a horse be slow the traces may be shortened. If a horse becomes slow, there is usually something wrong, an ill-fitting collar, tender feet, or some internal ailment, and the driver should find out what is wrong, otherwise the slowness may become a habit, and horses are prone to habits. The use of a whip on the team is not warranted; a well cared for horse does not need a whip, and the need of a whip reflects neglect for the horses on the part of the owner or driver.

Sometimes it may be found after the team has not worked for some time, that they may be inclined to be very free for a few rounds of the paddock, in this case do not let them go in the hope that they will steady down, but give them an occasional spell, and they will settle down to their usual gait in a very short time. On no account, allow the team or part of it to trot around a corner, it may result in them stepping on one anothers' feet, and it is not in the best interests of everything concerned if any of the swingle-trees should break. Be careful in the manner in which the reins are handled, a steady pull is all that is required. Jerking the reins only excites the horses, teaches them the nasty habit of throwing up their heads—not only one horse—but the whole team, and makes them generally hard to guide.

When finishing the day's work have the horses in the stable by sunset: it is better to have them out ½ an hour earlier in the morning than to come home after sunset, wet with sweat. Some drivers make a practice of allowing the horses to run home loose after the day's work; this may be in order providing they do not trot; if they are inclined to do this, drive them home, serious trouble may result to mares in foal through neglect in this manner.

TRAINING.

The "breaking in" or preferably the training of the young horses is important in the behaviour of the team. I prefer to use the term training instead of "breaking in" because farm-bred horses are not outlaws; they can be trained without any breaking process. Start to train the young horse for work at about 2½ years old, and do not make pets of foals, it spoils them for when they are ready for work. When they are handled they expect to be petted and the training may be a longer process than is usually the case.

When catching the 2-year old for the first time, try not to excite him; run him into a loose box if one is available, and with the aid of a pole, slip a lassoo around his neck, using a good strong rope, snubbing it around a stout post, and allow the horse to pull back but not choke down. Make a knot in the lassoo rope so that it does not pull too tightly and thus choke, but at the same time it must be tight enough to prevent the rope from slipping over the ears or its head, and on no account must the young horse get away once it is caught. Having a good pull on the rope will teach him to respect the rope, and after that first pull it is seldom he will try the strength of a rope again. For the first 2 or 3 days he should be taught to lead and stand, lift up his feet occasionally; it all helps to make a quiet horse.

The first time in the team, put him in the body of a tandem team on the near side, on pulley equalizers, with a good strong rope around his neck and tied to the spreader of the leading horse, a leading rope tied to the bit is advisable in case the harness is not as strong as it was thought to be. Hitching in the team, the young horse must take its share of the load, and respecting the rope he will not pull back to any extent, and he soon learns to walk along with the other horses. Be lenient with him; a couple of hours the first day is sufficient and gradually lengthen the time, and for the first 6 months if it is possible, only work him half days. It is not advisable to let the young horse into the main stable for a fortnight or so; it is much better to keep him in a loose box and tied up while feeding. After he has settled down he may take his place and be tied up in the main stable and then let run with the other horses, not forgetting to put a halter on him. This will help to avoid any trouble in catching him the next morning, and if tied up always in the same place, he will be like the other horses and soon learn which is his place. The main point in training is to teach the horse to obey commands, but at the same time not to be frightened of you and not to tremble when approached. A cool temper and patience exercised on the part of the owner will result in the training of a horse free from vices and of a good nature.

To keep the farm team healthy a certain amount of attention is required. If an animal contracts an illness call the vet. immediately. Give every horse a stable physic ball once a year, accompanied with bran mashes; just before seeding operations commence.

[*Papers Read at Conferences.*]

My reasons for this are that in all probability the horses are not working, or are on very light work, for when given a ball they should be spelled for a day or so, because the aperient affect has a tendency to weaken the animal for a short time; also they have been in the stubble paddocks for the previous months, and this is a suitable time to cleanse their systems; the horse will do better and improve his condition. If, the administration of a physic ball necessitates the calling of a surgeon, at the same time have the teeth of every animal examined; a horse with faulty teeth is rarely in good condition.

When starting to feed new season's hay it is advisable to mix it with old hay, half of each, and watch the horses carefully—new hay may bring about colicky pain in some horses, others it may affect in different ways.

The shoeing of farm horses is not a general practice, but do not neglect their hooves. Keep them well trimmed, using a saw, rasp, and if needed, a paring knife; cracking and splitting can in this way be prevented. Occasionally a horse may have to be shod when wheat carting or working on stoney land.

Sore Shoulders.

Sore shoulders are caused mainly by ill fitting collars. The collar may be too small or too large, or the harness poorly adjusted, but usually the relining of a collar is a sure remedy. Do not wait until a horse has a sore before having the collar relined. The check lining may be in good order, the collar hard and flat, if so have it relined. At times a horse has a tender shoulder and is prone to sores; but the saddler, will line the collar to a special shape to suit that horse. If a sore shoulder appears, and the collar cannot be repaired for a day or so, the use of a bag under the collar is helpful, but only until the collar can be repaired.

During summer, flies may cause a team to be very restless. Be considerate and provide each horses with a fly net. These can be very simply made from old binder twine, and are well worth the time taken to make them.

Once a year trim the manes and tails of the horses. It is an ideal job on a wet day. Comb out the hair with a blunt pocket knife, and the hair will pull out quite easily. With this method it can be thinned out and the tail made to look quite shapely. Usually horses do not object to this procedure, but be very careful with a mare in foal; do not trim her tail unless she is very quiet.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on May 29th, there being present:—Messrs. A. J. Cooke (Chairman), R. H. Martin (Vice-Chairman), A. J. A. Koch, S. Shepherd, F. Coleman, P. J. Baily, H. N. Wicks, J. W. Sandford, Hon. A. L. McEwin, M.L.C., and H. C. Pritchard (Secretary). Apologies were received from Professor A. J. Perkins, Dr. A. E. V. Richardson, and Mr. J. B. Murdoch.

Life Members.—The following names were added to the roll of life members of the Agricultural Bureau:—Brinkley Branch, H. D. Humphrey, A. B. Martin, and E. W. Pearson; Black Rock Branch, R. E. Kitto; Mount Pleasant Branch, E. J. Tapscott; Wepowie Branch, J. F. Burns; Mount Barker Branch, W. E. Daddow, E. P. Mappley, W. H. Cozier, and E. G. A. Tyrie.

New Members.—The following were approved as members of Branches:—Bute—Leonard H. Paterson, G. P. McDonald, J. G. Mohr, A. C. Brideson; Butler—Gilbert Wilford; Chandada—Joseph Carberry; Clarendon—Fred. Smart, Frank Mitchell; Coonalpyn—Chas. G. L. Tiller, Richard Sparnon, Alfred Chandler, Jas. O'Donoghue, F. F. Smedley, Syd. W. Smedley, Jack F. Smedley, Geo. R. Smedley, Roy Smedley, Albert Francis; Coonawarra Women's—Mrs. Frank Lynn; Goode—R. Mundy; Greenock—A. F. Giles; Mangalo Women's—Mrs. H. Olsen; Monarto South Women's—Miss D. Hartmann; Mount Gambier—C. G. Lucas, G. W. Langberg; Mudamuckla—S. D. Rohrlach, F. W. Dunstall, P. Flaherty; Narridy Women's—Mrs. J. W. Darley, Miss E. Darley; Palabie—Douglas Swanson; Pinkawillinie—G. C. Wake; Pinnaroo—Glen. M. Hawthorne, Alan D. Hawthorne, Les. Sheldon; Roberts and Verran—I. C. Cowley; Springton—A. N. Colebatch; Sandalwood—H. G. Neindorf, B. J. Curtin; Warramboo Women's—Mrs. O. M. Bayly, Miss L. E. Helberg; Wasleys—Harvey Venning, Gerald Ronan; Wasleys Women's—Mrs. H. Nield; Wirrabara Women's—Mrs. I. J. Harding, Mrs. B. A. Tucker, Mrs. J. Rafftry, Miss Rose Raffrty; Wirrilla Women's—Mrs. A. Woods, Miss E. Bauer; Wudinna—Martin Grocke.

Members of New Branches.—Whitwarta—F. J. G. Collins, Jack Kostera, P. P. Kostera, L. Kostera, H. L. Wachtel, W. Dunow, sen., W. Dunow, jun., E. W. Wilson, W. H. Hoepner, J. P. Hoepner, R. E. Maxwell, J. H. Wilson, A. J. Angel, R. E. Angel, G. M. Heaslip, J. Dunow, R. Wilson; Chapman's Bore—W. Whitehead, J. P. Krollig, C. Menadue, C. H. Buller, E. Buller, R. Ackland, R. Munroe, C. Calliss, A. C. Calliss, C. H. Randell, H. Kinlough, B. Wohfiel, W. T. Burbridge, H. E. Burbridge, S. Burbridge; Carey's Gully—F. W. Sharp, J. Burfitt, L. Neighbour, E. Hart, Hurtle Badenoch, Arch. Badenoch, C. Badenoch, L. Badenoch, A. Vierson, W. Cook, T. Jarrett, T. R. White, W. H. Edwards, L. A. Edwards; Coonalpyn Women's—Mrs. M. C. George, Miss E. E. George, Mrs. C. E. George, Mrs. P. Hayden, Miss Mary Hayden, Miss Veronica Hayden, Mrs. R. V. Potter, Mrs. J. O'Donoghue, Mrs. F. F. Smedley, Miss Mary Smedley, Mrs. Syd. Smedley, Mrs. W. Videon, Miss Esther Fox, Miss Una Fox, Mrs. G. Gibbs, Mrs. W. McCracken, Mrs. R. Sparnon.

New Branches.—Approval was given to the formation of new Branches at Whitwarta (17 members), Chapman's Bore (15 members), Carey's Gully (14 members), and Coonalpyn Women's (17 members).

Branches to be Closed.—It was decided to close the Neeta, Kanmantoo, Colton, and Rosy Pine Branches.

Margarine.—Resolution, Dairy Conference, Mount Barker:—"That we view with grave concern the serious effect margarine and all butter substitutes are having on the dairying industry, and that we urge both Federal and State Governments to take immediate

action to enforce at least 6d. per lb. levy on all butter substitutes manufactured in competition with dairy butter.'' It was decided to support this resolution, and bring it under the notice of the Minister of Agriculture.

Oiling Systems on Farm Machinery.—At the April meeting the Balumbah Branch asked that encouragement be given to manufacturers to improve the systems of oiling farm machinery. Mr. Shepherd stated that unless a personal inspection was made frequently it was difficult to deal effectively with the matter. Most engines have ample provision for oiling. Colonial ploughs, cultivators, and disc implements had the best oiling systems and grease caps. Nearly all windmills had a self-oiling bath which could not be improved, and most of the latest grass mowers, cream separators, portable forge blowers, and superphosphate broadcasters had perfect systems. Sheep-shearing machinery was equipped with ball and roller bearings needing only seasonal attention. Saw benches lacked good systems; corn-grinders were well catered for; wagons, trollies, and horse-drawn vehicles were ill equipped. Alemite and alemite zerk systems could be more generally used in combines, headers and harvesters. The sheaf binder requires a better system, many being unprotected with regard to sand, a matter which needed more attention. The alemite system was favoured, but its general application was not practicable. The wick system was costly. The quality and kind of oil for each machine was of great importance. The Secretary was instructed to forward a copy of Mr. Shepherd's comments to the Balumbah Branch.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING APRIL, 1935.

IMPORTS.

Interstate.

Apples (bushels)	698	Plants, ornamental (packages)	69
Bananas (bushels)	13,127½	Seeds (packages)	61
Citrus—		Wine casks (No.)	2,333
Lemons (bushel)	1		
Oranges (bushels)	821	*Fumigated—*	
Passion fruit (bushels)	236	Citrus, oranges (bushels)	311
Paw Paws (bushel)	1	Peanut kernels (bags)	3
Pears (bushels)	9	Plants (packages)	6
Pineapples (bushels)	662½	Wine casks (No.)	39
Tomatoes (bushels)	1,037		
Peanuts (bags)	440	*Rejected.*	
Peanut kernels (bags)	83	Apples (bushel)	1
Beans (bushels)	30	Bananas (bushels)	11
Cabbages (bags)	2	Citrus, oranges (bushels)	19
Peas (bags)	23	Tomatoes (bushels)	5
Potatoes (bags)	645	Peanut kernels (bags)	25
Turnips, swede (bags)	16	Secondhand bags (No.)	90
Bulbs (packages)	53		

Overseas.

(State Law.)

Wine casks (No.)	906	*Fumigated.*—Wine casks (No.)	108

Federal Quarantine Act.

	Packages.	lbs.		Packages.	lbs.
Seeds, &c.	1,897	334,775	Tea chests	1,716	—
Canes	149	—	Plants	1	—
Cocoanut chests	660	—	Timber	52,987	260,217 sup. ft.

EXPORTS.

Federal Commerce Act.

		Packages.			Packages.
Belgium	Apples	8,250	Netherlands, East Indies	Celery	7
England	Apples	67,736	Scotland	Apples	2,833
	Grapes	120	Singapore	Apples	100
	Pears	7,007		Pears	135
Germany	Apples	15,772		Celery	29
India	Apples	2,372		*Other vegetables	62
	Grapes	40	Strait's Settlements	Celery	2
	Celery	29		* Other vegetables	5
	* Other vegetables	14			

* Potatoes excluded.

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO. LIMITED reported on 1/6/35:—

BUTTER.—The conditions for dairying during May continued generally satisfactory, and production, therefore, is steadily increasing. London values have advanced, and this is due to the decreased shipments that are going forward from both New Zealand and Australia, and a limited amount of purchasing by America of Latvia and Dutch butter is also assisting in firming values. Quotations to hand from London to-day are to the effect that choicest quality is increasing from 80s. to 81s. per cwt. Local values have receded somewhat during the month, and at present are:—Choicest creamery fresh butter in bulk, 1s. 2¾d. per lb.; prints and delivery extra. (This price is for local sale only, and, under the quota system, the equalised price manufacturers will receive will be 11d. per lb., on which basis payments to cream suppliers will be calculated). Separator lines, from 8d. to 11½d. per lb. for choicest; stores, 6d. to 8d. per lb. (These prices are subject to equalisation levies.)

CHEESE.—Fair quantities came forward from the South-East, but, under the influence of shorter supplies in the Eastern States, the market advanced sharply towards the end of the month, and values are 1d. per lb. higher than at the end of April. Production is increasing in the South-East, and in all probability the factories will commence exporting again within the next few weeks. London values for cheese are easier, owing to the heavy arrivals from New Zealand, and at present are 41s. 6d. to 42s. per cwt. for white and 41s. 6d. to 42s. 6d. for coloured. Present local rates are:—Large and medium, from 9½d. per lb.; loaf, from 10d. per lb. at store door, delivery extra; semi-matured and matured, 11d. to 11½d. per lb.

EGGS.—Under the influence of further shrinking in supplies prices advanced, but at present ample quantities are being received, and inquiry is not quite so eager. In the Eastern States markets fell during the last week of the month. Local rates are:—Ordinary country eggs, fair average quality, 1s. 2d. per dozen net; long distance rail or shipping eggs lower; selected new-laid clean eggs, full-sized, 1s. 5d. to 1s. 6d. per dozen net.

BACON.—There has been no alteration in prices. Fairly good trade is being reported in sides, middles and rolls, but hams are not in large demand. Values are:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 9d. to 9½d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 2d. to 1s. 4d. per lb.

ALMONDS.—The demand for shell almonds is keen, and, although fair quantities are coming forward, floors are being cleared. Kernels, on the other hand, are slow of sale, and stocks are accumulating. Rates are:—Softshells and Brandis, 8½d. to 9½d. per lb.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 10d. to 1s. 11d. per lb.

HONEY.—The market continues dull, and the heavy stocks are not moving to any considerable extent. Even the temporary discontinuance of the inspection fees for interstate trade in this line has not had the desired effect of creating a demand. Values are without change, being:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades, 1d. to 2d. per lb.

BEESWAX.—Manufacturers again purchased all available lots. Prices are steady at 1s. 4d. to 1s. 4½d. per lb., according to quality.

LIVE POULTRY.—Auction sales are held every Tuesday, Wednesday, Thursday and Friday at our sale rooms, which are in every way the best equipped in South Australia. Clearing sales arranged in any part of the State. A good demand has continued to rule for all prime quality, heavy-weight table birds. We advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 3s. to 4s.; nice-conditioned cockerels, 2s. 7d. to 2s. 11d.; fair-conditioned cockerels, 2s. to 2s. 5d.; chickens, lower; heavy-weight hens, 2s. 5d. to 3s.; medium hens, 1s. 9d. to 2s. 4d.; light hens, 1s. 4d. to 1s. 8d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 3s. to 4s.; young Muscovy ducks, 2s. to 2s. 6d.; ordinary ducks, 1s. 2d. to 2s.; ducklings, lower; geese, 2s. 6d. to 3s. 6d.; goslings, lower; turkeys, good to prime condition, 8d. to 10d. per lb. live weight; turkeys, fair condition, 6d. to 7½d. per lb. live weight; turkeys, poor and crooked breasted, lower; pigeons, 3½d. each.

POTATOES.—New season's, 7s. per cwt.

ONIONS.—Brown Spanish, 8s. 6d. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of May, 1935, also the average precipitation for May, and the average annual rainfall.

Station.	For May, 1935.	Av'ge. for May.	To end May, 1935.	Av'ge. Annual Rain-fall.
Far North and Upper North.				
Oodnadatta	—	0·30	1·04	4·66
Marree	0·01	0·59	0·76	5·88
Farina	—	0·65	1·03	6·43
Copley	—	0·98	0·80	7·87
Beltana	—	0·93	1·03	8·48
Blinman	0·08	1·33	0·85	11·86
Hookina	0·07	1·40	1·48	11·25
Hawker	0·10	1·35	1·60	12·26
Wilson	0·09	1·22	1·87	11·79
Gordon	0·03	1·00	1·56	10·53
Quorn	0·29	1·44	1·70	13·22
Port Augusta	0·15	1·10	3·79	9·44
Bruce	0·05	0·94	2·15	9·87
Hammond	0·09	1·04	2·69	11·21
Wilmington	0·43	1·97	3·03	17·32
Willowie	0·07	1·27	2·72	12·25
Melrose	0·87	2·56	6·53	22·88
Booleroo Centre	0·39	1·59	3·89	15·21
Port Germein	0·64	1·53	4·22	12·53
Wirrabara	0·69	2·10	4·03	19·29
Appila	0·53	1·49	5·30	14·65
Cradock	—	1·10	1·65	10·82
Carrieton	0·09	1·25	2·37	12·23
Johnburg	0·07	1·11	1·77	10·58
Eurelia	0·09	1·30	1·83	12·79
Orroroo	0·15	1·31	2·47	13·20
Nackara	0·07	1·24	2·57	11 09
Black Rock	0·10	1·28	2·11	12·37
Oodlawirra	0·14	1·19	2·30	11·68
Peterborough	0·23	1·32	3·38	13·22
Yongala	0·40	1·43	3·71	14·44
North-East.				
Yunta	0·07	0·96	2·50	8·55
Waukaringa	—	0·85	1·64	7·94
Mannahill	0·02	0·80	1·13	8·20
Cockburn	0·06	0·96	1·08	7·96
Broken Hill, N.S.W.	0·04	0·95	1·29	9·56
Lower North.				
Port Pirie	0·54	1·57	5·68	13·21
Port Broughton	0·91	1·68	6·69	13·88
Bute	1·40	1·86	4·58	15·44
Laura	0·86	1·87	6·33	17·95
Caltowie	0·82	1·78	5·11	16·74
Jamestown	1·19	1·82	5·03	17·69
Gladstone	0·92	1·70	6·54	16·29
Crystal Brook	0·89	1·78	7·57	15·78
Georgetown	0·93	2·10	6·20	18·37
Narridy	1·04	1·83	5·80	15·82
Redhill	1·01	1·94	6·42	16·59
Spalding	0·78	2·14	5·98	18·88
Gulnare	1·06	2·18	5·66	18·68
Yacka	1·19	1·75	5·54	15·39
Koolunga	0·86	1·70	5·52	15·38
Snowtown	0·87	1·85	5·38	15·74

Station.	For May, 1935.	Av'ge. for May.	To end May, 1935.	Av'ge. Annual Rain-fall.
Lower North—*continued.*				
Brinkworth	0·87	1·86	6·29	15·82
Blyth	0·92	2·05	7·14	16·78
Clare	1·41	2·91	8·17	24·51
Mintaro	1·39	2·74	8·29	23·42
Watervale	1·96	3·10	10·07	26·80
Auburn	1·99	2·77	8·46	23·98
Hoyleton	1·04	1·99	6·80	17·33
Balaklava	0·83	1·84	5·56	15·46
Port Wakefield	1·06	1·57	5·54	12·94
Terowie	0·32	1·23	2·80	13·35
Yarcowie	0·46	1·33	3·52	13·59
Hallett	0·60	1·68	5·50	16·46
Mount Bryan	0·72	1·80	5·38	16·83
Kooringa	0·89	1·98	4·73	17·85
Farrell's Flat	0·90	2·11	5·14	18·61
West of Murray Range.				
Manoora	1·10	2·19	6·57	18·92
Saddleworth	1·23	2·23	6·68	19·60
Marrabel	1·38	2·21	6·60	19·96
Riverton	1·78	2·37	7·82	20·81
Tarlee	1·38	2·06	5·58	18·10
Stockport	1·77	1·79	6·74	16·93
Hamley Bridge	1·49	1·75	6·02	16·54
Kapunda	1·63	2·25	5·67	19·79
Freeling	1·37	1·90	6·80	17·83
Greenock	1·86	2·37	6·73	21·53
Truro	1·13	2·15	5·48	19·89
Stockwell	1·41	2·16	5·81	20·13
Nuriootpa	1·76	2·22	6·88	20·72
Angaston	1·54	2·48	6·21	22·42
Tanunda	2·02	2·46	7·68	22·02
Lyndoch	1·90	2·50	7·06	23·40
Williamstown	2·05	3·13	7·52	27·77
Adelaide Plains.				
Owen	1·44	1·68	5·93	14·66
Mallala	1·28	1·93	4·65	16·56
Roseworthy	1·61	1·88	6·08	17·40
Gawler	1·64	2·29	5·74	18·91
Two Wells	1·34	1·87	7·67	15·75
Virginia	1·80	2·06	6·51	17·18
Smithfield	1·63	2·17	6·58	17·64
Salisbury	1·33	2·23	6·29	18·56
Adelaide	2·58	2·73	7·50	21·15
Glen Osmond	2·85	3·23	8·27	26·05
Magill	2·21	3·24	7·82	25·53
Mount Lofty Ranges.				
Teatree Gully	2·11	3·41	8·79	27·20
Stirling West	5·41	5·52	16·16	47·08
Uraidla	4·31	5·40	13·35	44·19
Clarendon	3·70	3·92	10·94	32·88
Happy Val'y Res.	3·05	—	8·37	—
Morphett Vale	3·02	2·66	7·82	22·66
Noarlunga	2·97	2·46	7·18	20·37
Willunga	2·29	3·43	7·91	26·02
Aldinga	1·95	2·47	5·91	20·27

RAINFALL—*continued.*

Station.	For May, 1935.	Av'ge. for May.	To end May, 1935.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*				
Myponga	4·97	3·77	11·70	29·50
Inman Valley	3·36	—	10·10	—
Yankalilla	1·68	2·93	5·70	22·83
Mount Compass	3·77	—	—	—
Mount Pleasant	1·61	3·01	6·54	27·23
Birdwood	1·91	3·20	7·92	29·21
Gumeracha	2·55	3·98	9·08	33·41
Millbrook Res.	2·98	4·63	11·03	34·68
Tweedvale	2·95	4·06	9·94	35·99
Woodside	2·49	3·64	8·39	32·31
Ambleside	2·67	3·93	9·45	34·90
Nairne	1·51	3·13	7·84	28·22
Mount Barker	2·00	3·71	8·76	31·31
Echunga	2·70	4·07	10·30	33·30
Macclesfield	2·35	3·33	8·96	30·43
Meadows	3·29	4·15	10·45	36·16
Strathalbyn	1·23	2·26	5·15	19·31
Murray Flats and Valley				
Meningie	1·75	2·23	5·55	18·37
Milang	0·73	1·68	3·88	14·91
Langhorne's Ck.	1·17	1·58	4·71	14·87
Wellington	1·36	1·57	5·28	14 65
Tailem Bend	1·28	1·75	5·34	15·06
Murray Bridge	0·67	1·43	3·65	13·56
Callington	0·51	1·62	3·51	15·19
Mannum	0·68	1·28	3·77	11·49
Palmer	0·70	1·62	3·78	15·63
Sedan	0·48	1·30	2·72	12·11
Swan Reach	0·83	1·21	2·77	10·64
Blanchetown	0·48	1·25	2·29	11·01
Eudunda	1·29	1·84	5·98	17·17
Pt. Pass	1·18	2·27	5·42	—
Sutherlands	0·68	1·18	2·58	10·84
Morgan	0·58	1·01	2·30	9·17
Waikerie	0·51	0·91	2·79	9·65
Overland Corner	0·46	1·07	2·13	10·32
Loxton	0·56	1·24	2·65	11·54
Berri	0·45	1·16	3·51	10·17
Renmark	0·45	1·06	3·82	10·41
West of Spencer's Gulf				
Eucla	0·34	1·28	5·66	9·96
Nullarbor	0 36	1·24	3·98	8·81
Fowler's Bay	1·12	1·70	4·67	11·94
Penong	0·80	1·70	4·29	12·27
Koonibba	0·63	1·41	4·78	12·13
Denial Bay	0·94	1·39	4·07	11·36
Ceduna	0·86	1·37	4·64	10·16
Smoky Bay	0·87	1·38	4·25	10·53
Wirrulla	1·04	1·20	5·73	10·54
Streaky Bay	1·75	1·91	6·55	14·88
Chandada	1·20	1·38	5·01	—
Minnipa	1·15	1·52	5·09	14·06
Kyancutta	1·35	1·26	5·75	—
Talia	2·24	1·85	5·41	14·76
Port Elliston	2·49	2·07	6·83	16·54
Lock	1·66	1·81	6·06	16·52
Mount Hope	2·97	—	6·04	—
Yeelanna	3·12	1·95	7·23	15·94
Cummins	2·59	2·06	6·10	17·60
Port Lincoln	2·40	2·34	5·39	19·42
Tumby	1·40	1·54	4·12	14·12
Ungarra	2·23	1·89	5·80	16·85
Port Neill	1·28	1·37	4·62	13·09

Station.	For May, 1935.	Av'ge. for May.	To end May, 1935.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—*continued.*				
Arno Bay	1·06	1·35	5·60	12·65
Rudall	1·26	1·62	5·59	12·64
Cleve	1·37	1·76	6·74	14·83
Cowell	0·45	1·19	3·65	11·07
Miltalie	0 94	1·56	6·76	13·67
Mangalo	0·79	1·60	5·55	13·· 1
Darke's Peak	1·68	1·66	6·53	15·18
Kimba	0·78	1·33	4·75	11·82
Yorke Peninsula.				
Wallaroo	1·40	1·86	6·34	13·98
Kadina	1·47	1·98	6·43	15·64
Moonta	1·68	1·94	5·56	15·06
Paskeville	1·22	1·90	4·90	15·49
Maitland	2·19	2·55	7·72	19·90
Ardrossan	0·99	1·69	4·15	13·97
Port Victoria	2·25	2·06	5·17	15·44
Curramulka	1·72	2·07	4·82	17·87
Minlaton	1·43	2·18	4·64	17·79
Port Vincent	0·84	1·58	3·55	14·43
Brentwood	1·97	1·88	5·05	15·55
Stansbury	1·16	2·07	3·84	16·82
Warooka	2·01	2·27	4·53	17·49
Yorketown	2·44	2·07	6·23	16·88
Edithburgh	1·73	2·03	4·34	16·37
South and South-East.				
Cape Borda	3·97	3·16	7·56	24·82
Kingscote	3·10	2·49	5·90	19·14
Penneshaw	1·89	2·08	5·77	18·92
Victor Harbour	1·81	2·55	5·75	21·37
Port Elliot	1·15	2·42	5·32	19·93
Goolwa	1·12	2·18	4·68	17·85
Maggea	0·85	0·93	3·08	10·04
Copeville	0·70	1·23	3·47	11·51
Claypans	0·67	1·04	2·88	10·38
Meribah	0·61	1·42	3·00	11·31
Alawoona	0·77	1·28	2·87	10·36
Caliph	0·73	0·87	2·90	—
Mindarie	0·76	1·40	3·10	12·21
Sandalwood	1·17	1·69	4·09	13·66
Karoonda	1·31	1·88	4·55	14·36
Pinnaroo	0·77	1·71	2·63	14·43
Parilla	1·01	1·66	3·75	13·82
Lameroo	1·32	1·84	3·82	15·97
Parrakie	1·17	1·83	4·93	14·62
Geranium	1·29	2·01	5·39	16·51
Peake	1·40	1·86	6·21	16·01
Cooke's Plains	1·56	1·56	5·29	15·30
Coomandook	1·73	2·07	5·54	17·09
Coonalpyn	2·11	1·89	6·73	17·61
Tintinara	2·05	2·24	6·83	18·71
Keith	1·78	2·30	5·43	17·92
Bordertown	1·27	2·07	55·4	19·21
Wolseley	1·24	2·00	5·14	18·49
Frances	1·76	2·17	6·84	20·11
Naracoorte	2·28	2·45	8·60	22·66
Penola	2·44	2·93	8·72	26·01
Lucindale	2·87	2·58	9·40	23·34
Kingston	2·91	3·05	8·05	24·28
Robe	4·63	3·05	9·53	24·67
Beachport	4·84	3·16	10·20	27·09
Millicent	4·51	3·44	11·78	29·79
Kalangadoo	3·77	3·72	11·07	32·28
Mount Gambier	2·79	3·42	9·67	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings. June	Dates of Meetings. July
Adelaide	—	—	—
Alawoona	—	—	—
Allandale East	—	14	11
Alma	—	—	—
Appila-Yarrowie	—	7	5
Arthurton	—	—	—
Ashbourne	—	12	10
Auburn Women's	—	R	R
Balaklava	—	23	28
Balhannah	—	—	—
Balhannah Women's	—	20	17
Balumbah	—	—	—
Balumbah Women's	—	5	3
Baroota	—	10	8
Beetaloo Valley	1439	17	15
Belalie Women's	—	11	9
Berri	—	11	17
Belvidere	—	—	—
Blackheath	—	20	18
Black Rock	—	—	—
Black Springs	—	11	9
Blackwood	—	10	8
Blyth	—	28	26
Booborowie	—	17	15
Booleroo Centre	—	14	12
Boolgun	—	—	—
Boor's Plains	1440	6	4
Boor's Plains Women's	1450	—	—
Borrika	—	—	—
Bowhill	—	17	15
Brentwood	—	6	4
Brinkley	—	12	10
Brinkworth	—	17	15
Brownlow	—	12	17
Buchanan	—	—	—
Bute	—	20	18
Butler	—	—	—
Caliph	—	4	2
Caralue	—	12	10
Carey's Gully	—	3	1
Carrow	—	12	10
Ceduna	—	—	—
Chandada	—	—	—
Chapman's Bore	—	17	15
Charra	—	—	—
Cherry Gardens	—	15	—
Chilpuddie Rock	—	—	—
Clare Women's	—	—	—
Clarendon	—	15	15
Cleve	—	1	6
Collie	—	5	3
Coomandook	—	28	26
Coonawarra	—	20	18
Coonawarra Women's	—	19	17
Cummins	—	14	12
Cungena	—	6	4
Currency Creek	—	17	15
Dudley	—	—	—
Echunga	—	12	10
Elbow Hill	—	13	11
Eudunda	—	3	1
Eurelia	—	8	13
Eurelia Women's	—	5	3
Farrell's Flat	—	28	26
Finniss	—	—	—
Frances	—	—	—
Frayville	—	—	—
Gawler River	—	—	—
Georgetown	—	15	13

Branch.	Report on Page.	Dates of Meetings. June	Dates of Meetings. July
Geranium	—	29	27
Gladstone	—	14	12
Gladstone Women's	—	18	12
Glencoe	—	11	9
Goode	—	—	—
Goode Women's	—	—	—
Greenock	—	17	15
Green Patch	—	13	11
Gumeracha	—	17	15
Hanson	—	11	16
Hartley	—	12	10
Hindmarsh Island	—	—	—
Hope Forest	—	3	1
Hope Forest Women's	—	—	—
Hoyleton	—	17	15
Inman Valley	—	20	18
Jamestown	—	19	17
Jervois	—	13	11
Kalangadoo Women's	—	8	13
Kalangadoo	—	8	13
Kalyan	—	19	17
Kangarilla Women's	—	20	18
Kanni	—	—	—
Kapinnie	—	—	—
Kapunda	—	14	12
Karoonda	—	19	17
Keith	—	13	11
Kelly	—	1	6
Ki Ki	—	—	—
Kilkerran	—	—	15
Kongorong	—	17	15
Koolunga	—	—	—
Koonunga	—	—	—
Koppio	—	19	17
Kringin	—	17	15
Kulkawirra	—	11	9
Kyancutta	—	4	2
Kybybolite	—	18	11
Kybybolite Women's	1449	—	—
Lameroo	—	15	13
Langhorne's Creek	—	12	10
Laura	—	28	26
Laura Bay	—	—	—
Laura Bay Women's	1449	11	9
Lenswood and Forest Range	—	—	—
Light's Pass	—	—	—
Lipson	—	15	13
Lone Gum and Monash	—	20	18
Lone Pine	—	17	15
Longwood	—	—	—
Lowbank	—	12	10
Loxton	—	14	12
Lyndoch	—	11	16
McLaren Flat	—	—	—
McLaren Flat Women's	—	6	4
Macclesfield	—	20	18
MacGillivray	—	11	16
Mallala	—	17	15
Maltee	—	13	11
Mangalo	—	—	—
Mangalo Women's	—	12	10
Marama	—	—	—
Meadows	—	12	10
Milang	—	15	13
Millicent	—	28	26
Millicent Women's	—	—	—
Miltalie	—	15	13
Monarto South	—	—	—

INDEX TO BUREAU REPORTS—*continued.*

Branch.	Report on Page.	Dates of Meetings. June	Dates of Meetings. July
Monarto South Women's	—	15	20
Moorlands	—	—	—
Morchard	—	14	12
Morchard Women's	—	26	24
Mount Barker	—	17	15
Mount Bryan	—	—	—
Mount Compass	—	—	—
Mount Gambier	1435	14	12
Mount Hope	1441	11	9
Mount Pleasant	—	14	12
Mudamuckla	—	8	13
Mundalla	—	—	—
Mundalla Women's	—	20	18
Murray Bridge	—	19	17
Murraytown	—	—	—
Mypolonga	—	—	—
Myponga	—	20	18
Myrla	—	12	10
Nantawarra	—	13	11
Naracoorte	—	8	13
Narridy	—	—	—
Narrung	—	—	—
Nelshaby	—	—	—
Nelshaby Women's	—	—	—
Netherton	—	12	10
Nunjikompita	—	13	11
Nunkeri	—	13	11
O'Loughlin	—	10	8
O'Loughlin Women's	1450	—	—
Overland Corner	—	12	10
Owen	—	10	8
Palabie	—	—	—
Parilla	—	18	16
Parilla Women's	1451	19	17
Parilla Well	—	17	15
Parilla Well Women's	—	25	30
Parrakie	—	—	—
Parrakie Women's	—	26	24
Paruna	—	7	5
Paskeville	—	11	16
Pata	—	7	5
Penola	—	1	6
Penola Women's	—	—	—
Penwortham	—	12	10
Petersville	—	11	16
Petina	—	22	27
Pinbong	—	—	—
Pinnaroo	—	—	—
Pinnaroo Women's	—	7	5
Port Elliot	—	—	—
Pygery	—	11	16
Pygery Women's	—	—	—
Quorn	—	—	—
Ramco	—	17	15
Redhill	—	—	—
Rendelsham	—	15	13
Rendelsham Women's	—	—	—
Renmark	—	—	—
Riverton	—	10	8
Roberts and Verran	—	—	—
Rosedale	—	—	—
Roseworthy	—	—	—
Rudall	—	11	9
Saddleworth	—	14	19
Saddleworth Women's	—	4	2
Scott's Bottom	—	15	13
Sheoak Log Women's	—	—	—
Shoal Bay	—	11	16
Smoky Bay	—	—	—
Snowtown	—	14	12
Snowtown Women's	—	6	4
South Kilkerran	—	3	1
Springton	—	5	3
Stanley Flat	—	17	15
Stockport	—	—	—
Strathalbyn	—	12	10
Streaky Bay	—	28	26
Sutherlands	—	6	4
Talia	—	28	26
Tantanoola	—	1	6
Tantanoola Women's	—	5	3
Taplan	—	11	9
Taplan Women's	—	—	—
Taragoro	—	13	11
Tarlee	—	—	16
Tatiara	—	—	—
Tintinara	—	—	—
Truro	—	17	15
Tweedvale	1443	20	18
Tweedvale Women's	—	17	15
Ungarra	—	20	18
Upper Wakefield	—	13	11
Waddikee Rocks	—	15	13
Waikerie	—	14	12
Wallala	—	12	10
Wanbi	—	26	24
Wandearah	—	11	16
Warcowie	—	11	16
Warcowie Women's	—	—	—
Warramboo	1442	11	16
Warramboo Women's	—	—	—
Wasleys	—	13	11
Wasleys Women's	—	6	4
Watervale	—	17	15
Waurultee	—	11	16
Weavers	—	10	8
Wepowie	—	17	15
Wepowie Women's	—	—	—
Whitwarta	—	17	15
Wilkawatt Women's	—	18	16
Williamstown Women's	—	5	3
Willowie	—	24	22
Wilmington	—	12	9
Wilmington Women's	—	—	—
Wirrabara	1438	—	—
Wirrabara Women's	—	20	—
Wirrilla	—	15	13
Wirrilla Women's	—	13	4
Wirrulla	—	19	17
Wolseley	—	10	8
Wudinna	—	—	—
Yadnarie	—	11	16
Yandiah	—	14	12
Yaninee	—	—	—
Yeelanna	—	12	10
Yundi	—	—	—
Yurgo	—	—	—
Yurgo Women's	—	—	—

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

LIFE MEMBERS OF THE AGRICULTURAL BUREAU.

At the May meeting of the Advisory Board of Agriculture the honour of Life Membership was conferred on Messrs. H. D. Humphrey, A. B. Martin, and E. W. Pearson (Brinkley Branch), R. E. Kitto (Black Rock Branch), E. J. Tapscott (Mount Pleasant Branch), J. F. Burns (Wepowie Branch), W. L. Daddow, E. P. Mappley, W. H. Croser, and E. G. Tyrie(Mount Barker Branch), in recognition of their having served the Agricultural Bureau for 20 years.

SOUTH-EASTERN DISTRICT.

MOUNT GAMBIER (Average annual rainfall, 30.55in.).

February 8th.—Attendance, 15.

Care of Seed.—Mr. E. S. Alcock, the District Agricultural Instructor, read the following paper:—"The greatest need in this district appears to be for more and greater care and attention to the selection of the seeds used for all classes of crops, also with regard to the annuals used for production of all kinds. This slackness appears to be universal throughout the world where good soils and favourable climate conditions prevail. The reason is probably owing to the favourable conditions. There never is any real adversity, and therefore the need for extra exertion is not necessary in order to secure some food. Some grass will grow somehow, whether the land is fertilised or not, and some crops will be harvested whether good, bad or indifferent seed is used. In examination of the rise and fall of production, disclosed by our factory returns, there is nothing to be proud of in such a fertile and favourable district as this. In other districts, where frequent adverse seasons are experienced, it has been found necessary to secure seeds of such varities as will suit those conditions. Take wheat for example. There are no varieties of wheat grown in the Commonwealth which have not been raised in Australia. A few years ago a salesman sold a good many bags of wheats from Denmark at very satisfactory prices to himself, but to-day you could not purchase a bushel of this variety locally grown at double the price, showing that it was not suitable for these conditions. The main points which suitable varieties have to maintain are as follows:—(1) Good yielders; (2) stand adverse seasons; (3) resist various diseases; (4) stand well and easy to harvest; (5) suitable for the purpose for which they are grown.

"The grower needs a variety which will yield well and give good returns of suitable produce of good sample and quality. This can be improved by the use of suitable seeds. If 100 grains of any cereal are sown, they will be found to vary very considerably, and this is where the selection of only the best will help to give improved results. This is the method adopted by plant breeders—individual selection for the improvement of the variety or breed. If we take examples of plants or animals we will find that they vary. This variation is called strain, and it is necessary to secure the best strain.

RESISTING ADVERSE SEASONS.

"In this district the need for varieties which have to stand dry seasons is not so apparent, but in the drier districts such precautions are necessary. In this locality, however, varieties are used for various purposes, such as providing early green feed or later varieties for hay or grain, or, in the case of potatoes, early ones which will be ready for digging when the old ones are done. These must possess sufficient hardiness to grow and produce prolific yields when required.

"Some diseases can be controlled by treating the seed before planting; others have to be kept under control by raising such varieies as show immunity to them. Rust and potato wilt are examples of such diseases. They can only be controlled in this manner. You have all experienced, perhaps never more so than this year, the difficulty of harvesting cereal crops that have lodged badly. Many will remember the older varieties of oats and wheat, which were much worse than many of the varieties grown to-day, but more in this direction can still be done by the selection of right strains suitable for the purpose. Very often one sees an unsuitable variety being used for a purpose, *e.g.*, many stockowners sow barley for early green feed when oats would fill the purpose much better. Early ripening varieties should be sown on the lighter lands, and the later ripening varieties on the heavier or later land. Some varieties of oats and wheat find more favour with the miller, and therefore are more readily sought after. The same remarks apply to both the barley and potato buyers.

CHANGE OF SEED.

"A change of seed seems to be the most popular method of improving all crops, not only in this district, but throughout the agricultural world. The belief is held that the continual growing of the same seed on the one farm leads to deterioration and is often spoken of as going wild. If this variety is to be kept pure and true to name seed must be secured from another area. Whenever this particular practice has been examined carefully the result is the reverse to the general belief. At Roseworthy College they have been growing the same seed of some varieties for the last 40 years and these varieties yield as well, and in some cases better than they originally did. Therefore if seed has deteriorated to such an extent that it needs replacing with fresh seed, it clearly shows that the seed has been neglected and it is not due to the continuous growing on the one farm. The same remarks apply to oats, barley, and potatoes, experiments having proved this to be the case.

"The advantages of growing your own seed are many. You do not introduce new weed seeds, neither is there the same danger of having to deal with new diseases which attack our crops, and this factor is a very great one to agriculturists.

HOW TO IMPROVE SEED.

"This can be done on the farm by those interested in this work, provided they are willing to go to a little trouble. First secure some suitable seed of a good variety, then when it is growing go through it carefully and take out all the strangers and foreign and diseased heads. This could be carried out on any farm so long as a suitable sized area was undertaken. Then you should have some seed reasonably true to name and free from other cereals. The seed obtained in this way can be sown the following year and then next year a much larger area can be hand picked, and so on until the whole area is reasonably clean and can be readily sown for seed purposes.

"The value of good seed is self evident. It means less seed is required for sowing, and good clean stands of vigorous plants are more certain. Poor seed means a poor stand, more seed is required, and weak, weedy crops result. Cheap seed is expensive and good seeds deserves a good price. Examine all seed carefully before purchasing and see that it is free from foreign weeds and seeds; thus avoid getting your paddock fouled with bad weeds.

GRADING SEED.

"Graded seed is almost unknown in this district, but since you depend a great deal on your crops for a livelihood they certainly deserve more attention than just sowing the seed as it comes from the thresher or harvester. The grader should remove all the weed seeds and also separate the largest and plumpest grains from the broken

and cracked and shrivelled ones. Grading has proved a profitable venture in all grain-growing countries and more than pays for itself. Increased crops result from the sowing of only the largest and best grains.

"Dr. N. A. Cobb, of the New South Wales Agricultural Department, tested this over a period of five years, using four varieties of wheats, and he reported as follows:—(1) The germinating power of the large seeds is greater than that of small seeds of the same variety and the same harvest. (2) Under similar conditions large seeds always give higher yields of both grain and straw. (3) The percentage of large grains from large seeds is always greater than from small seed. (4) The weight per bushel of grain produced from large seed is greater than that produced from small seed.

"The results of field experiments carried out with seed treated by grading machines make it appear as though the operation is worth an increased yield of about 2bush. per acre over and above that received from ungraded seed.

"Then allowing for the cost of plant and depreciation, loss on small cracked grain, and all payments necessary, it should not at any time cost more than 1s. per bushel to grade a bushel of grain even with the slowest machine on the market, and therefore it would not require a very great increase in the yield to pay for this extra work. Where graders are not available many men use the winnower and put their grain through several times with excellent results. Graded seed also runs more freely and evenly through the drill, which is a big consideration, as all will admit. Most of these results have been carried out with cereals, but nevertheless the same results are obtainable from potatoes.

"Perhaps one may ask, 'Why bother about these precautions with the low prices prevailing for cereals at the present time?' It is always necessary when prices are low to get your produce up well and make it attractive. Good seed of any kind commands attention and will always tempt the buyer to offer a little more." (Secretary, J. E. Morphett.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Rendelsham ...	14/5/35	10	"Making Dairying More Profitable," W. H. Downes	F. Todd, jun.
Tantanoola	4/5/35	17	Debate—"City *v.* Country Life"	L. J. C. Osborne

1935 CALENDAR 1935

JANUARY

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
●	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	●	19	20	21	22	23
24	25	26	27	28	...	...
...	...	...	...	...	...	...

MARCH

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	●	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	●	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	..

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

● FULL MOON.

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WIRRABARA (Average annual rainfall, 19.29in.).

3rd November.—Attendance, 12.

Mr. E. A. W. Harding read the following paper, entitled "Our School System and Agriculture":—"Our primary school provides education for children from 6 to 14 years of age. This is provided free of cost but is paid from general revenue of taxation. It is a debatable point as to whether a taxpayer without children should be asked to contribute for the education of other taxpayer's children. In larger schools an infant department forms a part of the school. Here much is done under the Montessori system. This plan of education was developed by Dr. Montessori of Italy and consists of much training in the form of play. Children up to the age of seven are trained by this system. The curriculum of the school, *i.e.*, the lessons to be given, is the same throughout the State. It may be argued that children of the cities need a training different from that given to rural children, but it has been found here that it is almost impossible to depart from our present plan to any advantage. The curriculum is almost identical for boys and girls; the only variation is in the manual work, as sewing is taught to girls and usually woodwork to the boys. Attendance at school from six years to 14 years within certain distances from school is compulsory by law. Children from six to seven years if within one mile of a school, from seven to nine years within two miles, and from nine to 14 within three miles are compelled to attend whenever school is open. After gaining a pass at the Q.C. Examination, students may branch off to various schools, namely, high schools, central schools, and technical schools. The high schools afford an opportunity to enter any of the professions, viz., doctors, law, engineers, dentists, science, &c. The central schools tend to a modified form of technical school having classes in woodwork, sheetmetal work, dressmaking, millinery, &c. The technical schools provide study for varying trades. The University is open to those who have passed certain subjects of the high school course. To matriculate a student is generally expected to pass the Leaving Examination. In the University various courses include medicine, dentistry, arts, music, engineering, forestry, law, &c.

It may well be asked in what way the State has provided an agricultural bias in education, since this is largely a farming community. This side of the education curriculum is being more attended to as time goes on. At present we have the Waite Institute as an adjunct to the University, and also the Roseworthy College. Only a limited number of students are catered for in these institutions. Lessons are being conducted in the majority of our primary schools where opportunity offers in elementary agriculture. The work here is more experimental than growing for profit. For instance, vegetables may be planted under varying conditions—different manures, rainfall variation, various soils, &c. These experiments prove forcibly certain facts to the boys doing the work. Boys are shown also the growth of various fodder plants under varying conditions. The better fodder plants for any particular district are thus discovered and can be grown more profusely. Certain high schools of our State also tend to an agricultural bias. Here the science of farming is more closely studied.

One of the most interesting aspects of our schools is the forming of Home Project Clubs. In these a boy or girl undertakes a particular work or project. It may be the rearing of a calf or a lamb, keeping bees, gardening, &c. The project worker aims at working for something at which he or she can get a profit. This seems a most admirable undertaking, as a boy may start with a calf and by studying the care and feeding he may later get a herd of cows and thus get a start in life as a dairy farmer. In one particular instance a lad at school started with half a dozen fowls and now at 19 years of age he is able to show a profit of about £100 a year, and has the start of a useful livelihood with an income. What is more, he is not unemployed. Another boy started with a hive of bees and now has the foundation of a very fine apiary. He also is learning the work connected with the honey at the right time, *i.e.*, when he is young. These boys get their start in life whereas others must have the stock bought for them and in these times very few are able to get that start. The project worker is expected to keep a record of the costs of his workings and to prepare a balance-sheet at the end of the year. He is thus able to determine whether there is a profit or loss on his undertaking. It is most probable that many farmers are unable to say exactly how they stand in this regard. Thus the project worker is taught the benefit of keeping proper, full, and true records of his transactions and workings. The project worker is expected to start off with as good a strain of stock as possible. He is made

to see that it costs no more to feed a cow of good breeding than to feed a mongrel; to feed 6 fowls laying 100 eggs each per year than to feed the same number laying double the quantity of eggs. But what a vast difference is the final result."

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Eurelia	15/5/35	5	"A Problem of Mixed Farming," E. P. Wall	E. P. Wall
Wilmington	22/5/35	12	Address—C. A. Goddard	Chas. Cole

MIDDLE NORTH DISTRICT.
(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).
April 15.—Attendance, 9.

PREPARATIONS FOR SEEDING.—Paper by Mr. J. Bugg:—"If seeding is to be a success good clean fallow is essential. If the land is ploughed in August, cultivated in September and October, and cultivated and harrowed again in February and March, it should be ready for seeding in April if weather conditions are favourable. The seed wheat should be graded and pickled well beforehand, so that there are no hindrances when seeding is to be commenced. If the implements used are drawn by means of horses, the swings should all be overhauled and the chains put in pairs so as to avoid sore shoulders. A spare swing is always handy on the implement in case of any break which may occur whilst the seeding is in progress. The combine as we all know has one of the most important duties to perform, so it is necessary that the implement be in good order. In some instances it is used in fallowing as a cultivator, just filled up with the necessary seed and super, and the seeding is in progress, but this should not be. Whether the implement is used as a cultivator or whether it is put under cover after each seeding season is over, it should be thoroughly overhauled before each seeding is commenced.

The first thing to look at is the super box. All the stars should be taken out and the super scraped off, and then the bottom of the box itself should be scraped and cleaned properly, thus allowing the stars to work freely. I might mention that an old horseshoe rasp is a good tool for removing super from the stars. Next look into the grain box, which I have often noticed left half full of wheat. This, however, shows very poor judgment on the part of the driver, as he should be able to judge for himself the quantity of grain he requires to finish the paddock, thus finishing with an empty box. But if the box is not empty when the job is finished, it does not take many minutes to brush the box out when preparing for seeding again.

Next look to the cogs or chains, whichever the case may be, which drive the stars and seed discs. These, if they have been oiled, naturally get filled with grit, and should be thoroughly cleaned before the machine is put in gear for seeding. From the cogs we look to the sections and tines. The tines often get loose, especially when working

in rough country, and these, to make a good job, should be properly spaced and bolted up tight again, so that they are unable to shift. A good idea is to put them in their right position and put a chisel mark right against the tine on the section, so that if they do move at all while working, it can be adjusted in the paddock without a lot of time being lost in measuring to get it right.

The Wheels.—These with a little care do a lot of work, if the oiling or greasing is carried out in the correct manner each day. If oil is used, the big wheels should be oiled once a day, and if grease is used once every three days is sufficient, whereas the small wheels in front, if oil is used, should be done twice daily, and if grease is used once daily is sufficient.

If the combine is left out in the weather the boxes should be covered so as to keep out all dampness, and if the wheels have wooden rims, it is advisable to jack the wheels up on to stones, so as to stop the wood rotting. Of course, the best of all methods is to have a roomy shed, in which all implements could be housed as soon as their respective jobs are finished.'' (Secretary, B. W. Giddings.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Narridy........	4/5/35	22	Mid. North Conference Report	J. Klingner
Booborowie	4/5/35	80	Social and Dance	A. T. Fairchild
Snowtown......	10/5/35	11	"Fat Lamb Raising," N. B. McDonald	A. R. Hocking
Redhill	7/5/35	12	Address—W. C. Johnston	S. A. Pengilly
Baroota........	13/5/35	16	Address—J. O. Hatter ..	E. W. Hulster

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Black Springs ..	23/4/35	—	Social and Dance	K. H. Dunn
Koonunga......	24/4/35	18	Paper from *Journal*	H. Mibus
Lyndoch	16/4/35	7	Formal	J. S. Hammat
Blyth..........	24/4/35	9	Address—C. A. Goddard	R. H. Eime
Wasleys	9/5/35	17	Report of Blyth Conference	C. R. Currie
Light's Pass ...	13/5/35	23	"Water Supplies," Messrs. L. Scholz, Best, Boehm, Len Plush, and C. A. Verrall	C. A. Verrall
Black Springs ..	14/5/35	7	Address—W. C. Johnston	K. H. Dunn
Lyndoch	14/5/35	17	Address—C. A. Goddard .	J. S. Hammat
Greenock	20/5/35	19	Question Box	A. Schubert
Gawler River ..	13/5/35	23	Addresses—T. Phelps and H. J. Copley	K. F. Roediger
Sutherlands	2/5/35	24	Discussion	E. R. Schiller

YORKE PENINSULA DISTRICT.

BOOR'S PLAINS (Average annual rainfall, 15.61in.).

4th April.—Attendance, 20.

HOUSING OF PIGS was the subject of the following paper by Mr. T. A. Stanway:—''I sincerely think that anyone anticipating breeding and raising pigs, to obtain the best results or success should, as far as possible, have reasonable housing. I am no authority on this topic, and have not been away to see housing of pigs by any of our leading State breeders, but with what I have read and using my own ideas I will endeavour to express the method that I think should be helpful. Firstly I will deal with the beginning, namely, when a sow is brought in to farrow. The housing for this

should be a good clean healthy pen or sty, made up of stone and mortar and cemented over 4ft. high on the walls and with a cement floor. The size I recommend for the sty is 10ft. in width, 14ft. in depth, 8ft. in height at the back or western wall, and 6ft. high in the front, being a fall of 2ft. to the east for the roof, and covering 11ft. only of the pen. My reason for this is to allow for sunshine. The division walls should be 4ft. high with a railing front; the floor should have a 6in. fall for draining when hosed down. Approximately two-thirds of the way from the back to front of pen, about 8ft. or 9ft., reinforced concrete 4in. to 6in. high, with holes or drains should be made about 7ft. 6in. across the pen to hold bedding for the litter, the remaining 2ft. 6in. will act as a passage for a sow heavy in pig to come to the feeding trough, which would be placed between the concrete and front railing. The pens should have railing around three sides as far as the concrete that is built across the pen. As already stated, these should be 9in. from floor and 7in. to 9in. from wall to avoid squeezing the young against the wall. I also recommend escapes for the little pigs at the rear of the pen, so that they can go out into a small pen at the back and be fed to themselves when they take to feeding, about three to four weeks of age. This helps the little ones and also the sow, and it enables one to feed them on a ration suitable for little pigs, and the mother is unable to interfere. These little pens at the back should also have hard floors with light timber pens, about 4ft. to 6ft. in depth and 10ft. long, that is, the same size as the width of the farrowing pen. These pens should have a portion of the floor made of wood lying on the cement and movable, so that the sow and little ones could choose which to sleep on. This is essential, especially in winter. Housing of pigs in pens should be well ventilated; it is not necessary for them to be in a draught, but plenty of fresh air should blow over them, and not directly on them; especially a sow suckling little pigs, because they are tender and will more than likely catch a chill, and this is injurious to the mother and little ones. It is a good idea to have air vents in each pen about 4ft. long by 2ft. 6in. high well up over the pigs' heads, say 5ft. or 6ft. high, and reaching to the top, with flat or small-flute galvanised iron to be swung so that it should be either opened or closed with the aid of a small iron bar, according to weather conditions. This class of housing coupled with proper feeding gives quite good results. If small pasture fields are available it is desirable for the sow and young to be turned out on this when the little ones are about a month old, with a straw stack and fork uprights and straw for shelter. If pasture runs are not available, I would recommend keeping the little pigs in pens (design already mentioned) for about a month after weaning and give them a good start, and then let them into runs of several acres, where they can have free access to plenty of clean water to drink (ball-tap system) and self feeders, the feed to be under shelter from the weather.

The housing for paddock runs is a good straw stack and fork uprights covered with plenty of straw and well protected on the north and west, so that it will make good sleeping quarters and be warm during the winter months. I also think a concrete wash-pool helps to keep pigs clean of vermin where straw stacks and straw shelters are used for shelter in pig runs. Straw stacks should be burned about every two years to rid parasites, and fresh stacks built. This would help to keep the pigs healthier. Where pigs use the self-feeder, it should be placed if possible on a hard floor and well sheltered, keeping the grain ration from being dusted, also from getting wet or muddy around the feeders. It is advisable for the sleeping quarters to be some distance away from feeders in order to give the pigs some exercise. If pigs are kept under reasonable conditions and in shelters warm in winter and cool in the summer, in something like the housing I have tried to explain, it will help to give us a more profitable return for our labour.'' (Secretary, S. G. Chynoweth.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Bute	30/4/35	12	Address—W. C. Johnston	H. G. Perry
Boor's Plains ..	2/5/35	32	Address—H. J. Apps ...	S. G. Chynoweth
Paskeville	14/5/35	6	Paper from *Journal*	J. Prouse

WESTERN DISTRICT.

MOUNT HOPE.

16th April.—Attendance, 5.

Our Birds and Their Aid in Agricultural and Pastoral Pursuits.—The following paper by Mr. R. L. Myers was read by the Secretary:—''Many of the ills or hardships from which we suffer in our occupation as farmers and pastoralists are brought about

by the unbalancing of natural agencies, and among these agencies are the birds. It is said, and I think rightly too, that everything that Nature has brought into being has its function to perform in order to keep everything working smoothly and correctly. It is the interference by man of these laws of nature that often causes trouble. Birds are sent to act their part in the balancing of Nature's laws. Last season, many places suffered severely through the grasshopper plague. Who knows, but for the loss of many of our valuable birds such as the scrub turkey, plover, curlew, and others, through the introduction into the country by foolish unthinking individuals of that cunning and cat-like animal the fox, it might not have occurred. Reynard is not native to our land, therefore Nature did not intend him to be here. Then again man introduced the rabbit. In attempting to destroy the evil he had introduced, man has destroyed many useful birds and animals such as crows, opossums, and others, yet the rabbit, which he seeks to destroy, is as plentiful as ever, and according to late reports from northern pastoral areas, there is a grave danger that he will be the means of turning a great deal of that region into a barren wilderness.'' (Secretary, J. L. Vigar.)

WARRAMBOO.

April 12th.—Attendance, 6.

Mr. F. Chilman read a paper entitled ''A Review of the Past Year'' as follows: —''Taking last year on the whole it was very unsatisfactory from many points of view. We had early rains, a dry winter, good spring rains which were putting a good finish on a bad start. We had 5 points in January, 62 for February, 52 for March. These rains gave the weeds and grass a fair start, and that was the time when all fallow should be worked up, as working the fallow in early autumn, especially when we have early rains, tends to make all weeds germinate, as well as conserving moisture for the following crop. I am inclined to believe that too much time and working is put into fallows in this district in the spring and early summer instead of in the autumn. I admit that weeds must be kept down on fallow, but try and get sheep to do that. After any rain during late summer the fallows should be immediately harrowed, as that is when you conserve the moisture, not before summer. Seeding operations were mostly on the dry side, but with the early rains starting the weeds they were easily killed, and a fairly clean crop could be grown. During the last two years I have ploughed up some grass land at the end of the summer and worked it back at seeding time, and it has turned out as well as any I have put in. That working is against our experts' advice, so I would not advise you adopting that practice, but try a small plot. We had good rains the last part of the year which gave the crops a good finish, and although on the thin side, would have yielded well for the stubble as there was a good plump grain and good heads, but owing to a mild winter and good spring rains swarms of grasshoppers hatched out and sadly depleted the crops.'' (Secretary, H. F. Chilman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Lipson	20/4/35	9	Discussion	M. Barraud
Butler	25/4/35	11	Address—H. D. Adams	C. F. Jericho
Maltee	25/4/35	8	Papers from *Journal*	E. Schwarz
Kelly	4/5/35	30	" Travel Talk," G. W. Cant	F. R. Illman
O'Loughlin	18/4/35	14	" Recreation," J. Hedger	E. R. Pfeiffer
Goode	15/5/34	8	Discussion	B. A. Linke
Green Patch	16/5/35	5	Discussion	C. J. Whillas
Balumbah	21/5/35	5	Formal	A. Jericho
Pygery	14/5/35	11	Address—W. H. Brownrigg	A. Day
Pygery	16/4/35	7	Discussion	A. Day
Kyancutta	2/4/35	13	" Common Ailments of the Horse," E. K. Dyke	E. A. Kelly
Kyancutta	7/5/35	18	Address—W. H. Brownrigg	E. A. Kelly

EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Coonalpyn	17/4/35	33	"Farm Economy," R. V. Potter	C. C. George
Lameroo	30/4/35	14	Address—C. A. Goddard	A. G. Potter
Geranium	2/5/35	9	Address—C. A. Goddard	L. S. Prouse
Pinnaroo	6/5/35	17	Address—R. L. Griffiths .	H. L. Badman
Waikerie	10/5/35	12	Election of Officers	F. B. Harden
Yurgo	29/4/35	17	Address—R. L. Griffiths .	H. M. Mackenzie
Coonalpyn	15/5/35	45	Address—E. Leishman...	C. C. George

SOUTH AND HILLS DISTRICT.

TWEEDVALE (Average annual rainfall, 35.97in.).

April 11th.—Attendance, 18.

SWINE HUSBANDRY.—Mr. L. H. Harrison, Manager of the South Australian Farmers' Union Butter Factory at Woodside, gave an address dealing with bacon curing and the care of pigs. In referring to the best type of pig to be kept, he said it was necessary to find the right pig for both the 90lbs.-100lbs. type for shop weights and also the 140lbs. pig for export. He favoured the cross from a Berkshire boar and a Tamworth sow, which produced a type of pig giving a good ham (for bacon factories), but without the thick shoulder and heavy jowl which was found in the pure Berkshire. The York was rather too thick in the head. Pigs should be allowed a large yard for exercise, but should be confined in a sty or pen for fattening. The fattening should occupy about six weeks. If concrete floors were used in the pens, a portion of the floor should be covered with boards for the pigs to sleep on, because concrete, in spite of an abundance of straw, would always be cold. (Secretary, B. Schapel.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Inman Valley...	18/4/35	12	Address—R. Hill........	A. M. Fuller
Longwood......	13/4/35	11	Homestead Meeting	H. G. Haines
Blackheath	2/5/35	11	Paper from *Chronicle*	E. H. Paech
Macclesfield	16/5/35	7	"History of Cattle Breeds," K. Bowen	H. D. Ross
Milang	17/5/35	26	"Agricultural Activities in W. Aus."—Hon. H. J. Yelland, M.P., W.A.	L. E. Yelland
Springton	8/5/35	12	Address—C. A. Goddard	E. Brokate
Jervois	16/5/35	11	"Preparing Sultanas for Consumption," Clive Schultz	F. P. Baily
Hartley	15/5/35	13	Discussion	W. J. Brook
Lenswood and Forest Range	20/5/35	11	Discussion	B. F. Lawrance
Cherry Gardens	18/5/35	11	Homestead Meeting—J. C. Blakeley	A. R. Stone
Strathalbyn	15/5/35	20	Pruning Demonstration and Address—H. H. Orchard	Reg. Sissons
Blackheath	23/5/35	9	Paper from *Farm*	E. H. Paech
Scott's Bottom .	16/3/35	12	Field Day	E. L. Atkinson
Scott's Bottom .	16/4/35	7	"Ploughing," M. Thorpe	E. L. Atkinson
Scott's Bottom .	18/5/35	7	"Pig Littering," Mr. Boekers	E. L. Atkinson

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

COOKERY AND FLOWER EXHIBITIONS.

SUCCESSFUL DISPLAYS BY WOMEN'S BUREAUX.

PINNAROO.

The members of the Pinnaroo Women's Agricultural Bureau have every reason to congratulate themselves upon the fine flower and cookery exhibition which they staged on 5th April. This was the occasion of the third annual function and proved to be even more successful than that of last year, The enthusiasm displayed in this function was remarkable, with the result that there was a very big increase in the number of entries, and much keener competition took place. The exhibition drew a large attendance, including many visitors from Parilla, Parilla Well, and other surrounding districts.

Mr. F. C. Richards (Assistant Secretary to the Advisory Board of the Agricultural Bureau) opened the show. Mrs. C. R. Mattiske presided during the afternoon.

Much praise is due to the organisers for their sterling efforts in providing such a fixture with such outstanding results. They were headed by the President and the Secretary (Mrs. C. H. Atze). The judges experienced an extremely difficult task in selecting the various prizewinners. One of the features of the display was the table decorations by girls (who are now admitted to the Branch). These were of excellent design and attracted a good deal of attention. The large array of cookery was a treat to see, while the flowers kept the gathering greatly interested. In all, the entries totalled 230, this being an increase of 96 on last year. The following were the judges:—Flowers—Miss Colwill, Mesdames A. W. Welden and C. Phillis; cookery—Mrs. A. Sands; preserves—Mesdames Johnston, Napper, and M. S. Davis.

PARILLA.

The outstanding activity of the Parilla Women's Branch is the annual Cookery and Flower Show, which this year was held on 17th April. This function always arouses very great interest, and is attended by a large number of people. Each year the number of entries has shown an increase, a record number being received for 1935. Much of the success of the show is due to the energetic committee of the Branch, particularly the Hon. Secretary (Mrs. Welden). The Assistant Secretary of the Agricultural Bureau (Mr. F. C. Richards) officially opened the show. Flowers and preserves were judged by Mesdames Atze, Fewings, and Mattiske, and the cooking entries by Mesdames Billing and Vaughan and Miss O'Loughlin. The judges spoke in very high terms of the exhibits, the preserves and some of the cake entries calling for the highest commendation. One of the judges in these classes stated that the articles exhibited would not disgrace any show in the State.

COONAWARRA.

The meeting of the Branch held on 16th April took the form of a Cake and Biscuit Competition, the entries being judged by Mrs. R. Black, of Penola. There was an attendance of 48, including visitors from Kalangadoo and Penola. The following are the recipes of the prize winners in the various classes:—*Sponge Sandwich* (Miss G. Seichleman).—4 eggs, ½ cup each cornflour and plain flour, ¾ cup sugar, 3 tablespoons milk, small piece of butter, 1 teaspoon cream tartar, ¼ teaspoon soda. Beat sugar and eggs until sugar is dissolved, add sifted flour, cornflour, cream tartar, and soda. Add warm milk and melted butter. Bake 20 minutes. *Pound Cake* (Mrs. R. Childs)—1lb. each butter, sugar, plain flour, currants, sultanas, ¼lb. each S.R. flour and peel, 8 eggs, and a few almonds. *Ribbon Cake* (Miss O. Lear).—½lb. butter, 1lb. each sugar and flour, 6 eggs, 1 cup milk, 2 teaspoons cream tartar, 1 teaspoon soda. Cream butter and sugar, add eggs, then milk, flour, &c. Divide into three parts. Flavour white with essence of lemon and pink with vanilla. Add 4 teaspoons of cocoa mixed with boiling water to the third. *Sultana Cake* (Mrs. R. Childs).—1lb. each butter, sugar, sultanas, and plain flour, ¼lb. S.R. flour, 8 eggs. *Jam Roll* (Miss D. Stafford).—4 eggs, small cup sugar, 1 teaspoon each butter and cream tartar, 2 tablespoons milk, ½ cup each cornflour and flour, ½ teaspoon soda. Boat sugar and eggs 20 minutes, add flour that has

been sifted three or four times. Stir well. Add butter and milk (boiling). Bake in a roll tin for 10 minutes in a hot oven. Roll on a damp cloth. *Biscuits* (Miss G. Seichelman.)—*Iced Dean Deans.*—½lb. S.R. flour, ¼lb. sugar. Rub into flour and sugar 4ozs. butter, mix to a stiff paste with 1 egg and a little milk. Roll on a floured board and cut into 2in. squares. Bake until lightly browned. When cold, spread a little jam down the centre of each biscuit. Ice each side of jam with 1 pink layer and 1 white, then sprinkle with cocoanut. *Chocolate Cream Biscuits.*—12ozs. flour, 6ozs. each sugar and butter, 2 eggs, 2 tablespoons cocoa, ½ teaspoon each carbonate soda and vanilla, 1 teaspoon cream tartar, 1 tablespoon milk. Cream butter and sugar, add well beaten eggs and milk, then flour, risings, and cocoa. Mix together, roll out, and cut into shapes. Join with 1 cup icing sugar, essence vanilla, and 1 tablespoon hot water and a small piece of butter. *Shortbread Biscuits.*—¼lb. butter, ½ cup sugar, 2 cups S.R. flour, 1 egg. Cream butter and sugar, add egg and flour. Mix, roll thin, cut out rounds and cut out the centre of half the rounds, making rings. When cool, join together with raspberry jam and sprinkle cocoanut on jam. *Shortbread Sandwich Biscuits.*—2 cups flour, 1 tablespoon cornflour, 2 teaspoons baking powder, ½ cup butter, 2 tablespoons warm milk and raspberry jam, soft icing. Mix dry ingredients together, melt butter in warm milk and stir into flour, &c. Mix well, roll out and cut into finger lengths. Bake to a golden brown colour. When cool join together with raspberry jam, ice tops, and sprinkle with chopped nuts. Mrs. R. Childs also read a paper on "Cake Making." (Secretary, Mrs. F. Skinner.)

THE AGRICULTURAL BUREAU.

Reading a paper on this subject at the first meeting of the Narridy Branch, which was held on 4th May, with an attendance of 23 members, Mrs. Reynolds (Vice-President) said the time was opportune to speak to members—and particularly those of the younger generation—on the benefits to be derived from a Women's Branch of the Agricultural Bureau. She held the opinion that one of its main objects was to train the future women so that they could keep abreast of the great questions of the present time. By conversation, lectures, and discussions, members would obtain valuable information and assist them to become useful and intelligent citizens. The chief reason for the increasing popularity of the Women's Branches, Mrs. Reynolds thought was due to the fact that members were united in a common interest, each member had a desire to learn, and those in a position to teach did so in a spirit of comradeship. Those members who put most into the Bureau would certainly get the most out of it. A perusal of the activities of other Women's Branches which were reported in the *Journal* would show what a wide scope of domestic activities was discussed by rural women. As in all community organizations, membership entailed responsibilities, and the most successful Branch would be that one with the greatest number of members taking an active interest in the work. (Secretary, Miss B. Reynolds.)

FEEDING CALVES.

Ten members attended the meeting of the Tantanoola Branch held on 1st May, when the following paper was read by Mrs. Wilson:—"Leave the calf with its mother for at lease 24 hours. The calf should be left 24 hours before being fed. To teach the calf to feed, run it into a corner of a shed or yard. The calf should be fed on whole milk for at least a fortnight. Half a gallon of fresh milk is sufficient for a feed for a young calf. This quantity can be given twice a day. A little salt can be added to each drink, it will help to keep the calf healthy and make it look forward to the next meal. As time goes on the whole milk can be diluted, each drink being supplemented with a small quanity of calf meal. From 10 days to a fortnight old the calf can be given the opportunity of getting a picking of green feed. If more than one calf is being handled, it is most important to see that each has a separate drinking vessel, so that those that are inclined to be "bossy" do not receive more than a fair share of milk. Kerosene tins cut in halves make very serviceable drinking utensils. The calves that are being fed should be kept apart until all danger of them sucking one another is passed. Calves that are dropped in winter should be given a little hay-chaff each day, and kept in a warm corner of a shed at night. By feeding the calves as they become older near the water trough, they will readily make a practice of drinking when thirsty. Calves should be hand fed for at least four months. When finally turned out they should be given the run of a good feed paddock which should be well fenced. Kept in a paddock enclosed with fences in a bad state of repair, the calves will soon become rogues. A supply of water to which they have easy access is most essential." (Secretary, Mrs. E. Telfer.)

SAVOURIES.

Mrs. Schmerl presided over an attendance of 16 members at the April meeting of the Auburn Branch when Mrs. B. Allen read the following paper:—"To most men-folk, savouries for lunches are more acceptable than sweets. Sandwiches are both easily and economically made, as butter and bread are not expensive. Stale cheese and scraps of meat can be utilised when mixed with tomato sauce or mayonnaise. *Sandwich Fillings.*—3ozs. shredded Kraft cheese, 1 dessertspoon butter, 1 egg, salt, cayenne, and 1 tablespoon milk. Put all ingredients together into a small pan and stir over hot water until well blended and quite smooth. Put in a jar and use instead of Kraft cheese. This can be used for sandwiches with shredded cucumber, chopped celery and walnuts, shredded lettuce, chopped olives and gherkins, hard boiled eggs, chopped candied ginger, dates or spring onions. *Rainbow Sandwiches.*—Take a square tin loaf; half or quarter according to how many sandwiches are required; cut off the crusts all round. Cut into 4 equal slices the whole length of the loaf. Spread the first slice with butter and then tomato. Butter the next slice on each side and place over the tomato. Cover this with egg and lettuce then add the third slice of bread buttered on both sides. Beetroot makes the last layer. Spread the fourth slice on one side only and place on to the beetroot. Wrap firmly in a slightly damp cloth and place under a weight for 1 hour. Then slice down with a very sharp knife. For parties, cutters may be used to cut the sandwiches into various shapes, hearts, diamonds, clubs and spades. *A Savoury.*—To 1 cup of seeded lexias or sultanas, add 4 to 6ozs. of cold minced ham, 2 to 3 tablespoons of pickled cucumbers, pickle, salt and pepper to taste. Stir in sufficient cream or mayonnaise to bind and spread easily. Serve on triangle of toast as a savoury, or serve on lettuce leaf for a luncheon. It can also be served between thin slices of brown bread as a sandwich.

Thirteen members and a large number of visitors attended the meeting of the Wilkawatt Branch which was held on 21st May, at Mrs. F. Koch's residence. The hostess read the following paper:—"To those who do not like making sandwiches—which must be dainty to be attractive—savouries should commend themselves. They are increasing rapidly in popularity for suppers and afternoon teas, because most of them can be served cold, which is a point that will commend itself to most housewives. In many recipes the foundation for the savoury mixture is short or puff pastry, cream puff cases, fried bread, toast, bubble bread, home made sao biscuit and for the one who

prefers something still easier, there are the numerous unsweetened biscuits which can be purchased. Many of the recipes for the savoury mixture include those kept in the usual household store: Sardines, anchovy paste, cayenne pepper, beet, parsely, cheese, eggs, celery, watercress, lettuce, ham, tongue, potted meats or fish, whipped cream with the addition of minced chicken, salt and mustard. All recipes are free from sugar. Another good standby is boiled salad dressing or mayonnaise. *Boiled Salad Dressing.*—¾ cup each sugar and water, 1 tablespoon each S.R. flour, mustard and butter, 1 teaspoon salt, 1 cup milk, and ½ cup vinegar. Mix dry, sugar, flour, and mustard in a saucepan, then mix milk and water with the yolks of 2 eggs added to the dry ingredients. Add the butter melted and finally vinegar and salt. Stir continually while bringing to the boil. When just on the boil, remove from the fire, allow to cool, then bottle.

Sao Biscuits.—2 cups flour, 3 tablespoons butter, enough milk to make a stiff dough; ½ teaspoon of salt will improve the flavour. Roll out very thin, then cut into shapes and bake in a very hot oven.

Puff Pastry.—2 cups plain flour, 1 cup each dripping and boiling water. Rub fat into flour, add boiling water and mix well, then stand aside for several hours until very cold. Roll and spread very thinly with butter. Fold over to 3 thicknesses, roll and spread again, with butter. Fold and roll again and a third time roll and cut into shape.

Bird's Nests.—Take round biscuits, butter them thinly and put 3 or 4 boiled green peas in the centre. Whip some cream—mixed with a little salt and mustard to taste—stiff enough to put through the icing pump. Pipe this around the outside to form a bird's nest.

Chicken Puffs.—Take ordinary cream puff pastes and fill with a mixture of cold chopped chicken, mixed with a little mayonnaise and a flavouring of chopped celery, tomato or cucumber. If preferred hot, the chicken may be mixed with a good cream sauce. Brush over with beaten egg or melted butter and sprinkle with chopped parsley.

Bubble Bread.—1 cup of plain flour, piece of butter the size of an almond, 2ozs. grated cheese, pinch of cayenne and salt, and enough water to make a pastry mixture. Roll out as thin as paper and cut into desired shape. Bake in a moderate oven. Do not cook quickly. (Secretary, Mrs. W. Pritchard.)

THE WINTER VEGETABLE GARDEN.

Paper read by Mrs. H. Schwarz at the May meeting of the Maltee Branch, attended by 10 members:—"The cultivation of vegetables in the home garden will result in a considerable saving of household expenses. Where there is a good water supply and time available to devote to their proper attention, vegetables can be grown right through the year. Cabbage and cauliflower seeds should be sown late in December or at the beginning of January. Enfield Market and Sugar Loaf are two good early varieties and for late sowings Succession and Drumhead are recommended. Early Greenleaf and Autumn Giant with Phenomenal for later crop are the best cauliflowers. The seedlings should be set out into permanent beds in February or March, choosing a cool and cloudy day for the work. A fortnight before planting, dig up the beds and heavily manure the soil. The following varieties of other vegetables are recommended:—Lettuce, New York, Beetroot, quick growing Egyptian Turnip-rooted. Later sowings—Derwent, Globe and Obelisk. Small sowings of turnips, swedes and radish should be made every few weeks; turnips—Early Wonder, White Stone and Orange Jelly; radish, Long Red and White Icicle, and Turnip-rooted. Carrots, Early Shorthorn, Ox Heart and Intermediate. A bed that has previously been well manured and carried a crop of cabbages is best for root vegetables. Land that is to be sown to Beans or Tomatoes can be prepared just a ew days before sowing. Wood ashes scattered over the beds before raking will be a help to the plants. Best results will be obtained in dry weather if seeds are sown in shallow drills, then filled with water and left for a few hours before sowing. The seeds should then be sown thinly covered with soil, keeping it moist. Lettuce can be sown in the same way and the plants thinned out to the desired distances apart. The best variety of Silver Beet is that with the curly leaf. Good varieties of Peas are William Hurst and Yorkshire Hero. Do not forget a small plot of Parsley. If enough space is available, a bed of herbs including Sage, Thyme and Marjoram should be included. No vegetable garden is complete without Onions—White and Brown Spanish are two good sorts. Celery is easily grown and if only required for flavouring, only a few plants will be necessary. Keep all beds free from weeds and the soil frequently loosened by constant hoeing. Save wood ashes and store them in a dry place until required. Soot from the stove may be forked into the land around Carrots and Onions. If the soil becomes sour through continuous cropping, dig it up roughly, scatter air-slaked lime over it and leave for a fortnight. It can then be manured again and prepared for planting. All growing plants will benefit by an occasional application of liquid manure." (Secretary, Miss L. Bassham.)

KYBYBOLITE (Average annual rainfall, 22in.).
March 19th.—Attendance, 23.

Exhibition of Pickles and Sauces.—The following recipes accompanied the exhibits:—*Apricot Sauce.*—6lbs. apricots, 4 large onions and garlic, 3lbs. sugar, 3 pts. vinegar, handful cloves, handful whole ginger, 1 tablespoon white pepper, ¼lb. salt, cayenne to taste. Boil all one hour. Strain and bottle when cool. Cork tightly. *Fig Conserve.*—4lbs. figs, 3 cups water, 4lbs. sugar, juice of 4 lemons. Boil sugar and water together, add figs and lemon juice, boil 3 hours. *Clear Mixed Pickle.*—Break cauliflower into sprigs, cucumber in pieces, or gherkins. Peel onions and leave whole, and put in a basin with a few chillies. Make a strong solution of salt and boiling water and pour over vegetables and allow to get cold. Then strain and leave to dry on sieve for 1½ hours. Then fill bottles with vegetables and pour over boiling vinegar seasoned with peppercorns and cloves. Cover when cold. *Tomato Relish.*—6lbs. ripe tomatoes, 9 large onions, 2 tablespoons curry, 2 tablespoons mustard, 1½lbs. sugar. Peel tomatoes, cut, sprinkle with salt, leave over night. Cut onion in separate bowl. In morning pour off liquid, cover with vinegar, add salt and pepper. Boil 30 minutes. *Worcestershire Sauce.*—1gall. vinegar, 4lbs. treacle, 2ozs. garlic, 1 bottle (8ozs.) anchovy sauce, 2ozs. cloves, 1oz. cayenne, 2 small handfuls salt. Put garlic and spices in a bag and boil all together for 1 hour. Bottle when cold. Ready for immediate use. *Tomato Sauce.*—12lbs. tomatoes, ½lb. onions, 2lbs. apples, ¼lb. garlic, 1oz. mace, 1oz. turmeric, 4 tablespoons salt, 1 to 1½ bottles vinegar, 3lbs. sugar, 6 chillies, 2ozs. whole ginger, 2ozs. allspice, 2ozs. peppercorns, ¼oz. cayenne pepper. Boil 3 hours, strain and bottle. *Plum Sauce.*—Take 3lbs. of plums (dark), 1½lbs. sugar, 1¼ pints vinegear, 1 teaspoonful salt, ½ teaspoonful cayenne, ¼ teaspoonful cloves, ½ teaspoonful of ground ginger. Put the vinegar and spices on to boil, add fruit, and keep boiling steadily until nice consistency. Strain through colander. Put in dry bottles and cork securely. (About 2 hours to cook.) *Ripe Tomato Chutney.*—12lbs. tomatoes, ¼lb. salt, 3lbs. sugar, 1½ onions, 4 apples, ½oz. cayenne, ½oz. cloves, ½oz. allspice, 1½ pints vinegar. Peel tomatoes, boil until soft with the onions and apples. Cut up finely, then add the other ingredients and boil 5 hours. Bottle when cold. *Preserved Meat.*—Cut some cutlets from a leg of mutton. Roast them in the oven until nicely cooked. Have ready some stock or gravy. Mix ¼oz. gelatine to 1 pint stock. Fill the bottles with the meat and stock. Put on rings, covers, and clips; then put in sterilizer and bring to the boiling point (200 deg.). Let stand at that for ½ hour; lift out and stand aside for 48 hours, then repeat. Bring to 200deg. for ½ hour. Do not remove clips until after the second sterilization. *Tomato Chutney.*—6lbs. tomatoes, 2lbs. onions, 1 or 2 apples, 1 cup treacle, 1oz. whole ginger (bruised), 1oz. cloves, ½ teaspoonful cayenne, 1lb. sugar, 1 pint vinegar. Cut up tomatoes and onion, sprinkle with salt and let stand over night. Strain off liquid and put in preserving pan with all ingredients. Put ginger and cloves in muslin bag. Boil for ½ hour. Then thicken with 2 tablespoons of cornflour, mixed with cold vinegar. Allow to boil for a few minutes, then remove from the fire. Bottle when cold. *Tomato Relish.*—10lbs. ripe tomatoes, 1½lbs. apples, 1½lbs. onions, ½lb. sultanas, 3lbs. sugar, 1 quart vinegar, ¼lb. salt, 1oz. cloves, 1oz. ground ginger and allspice, ½oz. cayenne. Boil tomatoes in pan for 1 hour. Strain through sieve and put spice, &c., in muslin bag. Mix all ingredients and boil ½ hour. *Tomato Pulp Soup.*—Take 12lbs. of firm, ripe tomatoes, 4 sticks celery, 1 cup sugar, and 2 large onions. Cut up roughly, place in preserving pan (enamel) with 1 teaspoonful salt to each pound of tomatoes. Boil slowly 25 to 30 minutes, until all juice is out of them, and strain and measure. To each quart of pulp add a level teaspoonful of carbonate soda and boil 5 minutes. Bottle boiling hot in preserving bottles with glass lids and put into sterilizer. Bring to 180degs. and drop back to 160degs. and keep there for 1 hour. This may be thickened before bottling if liked. Have the water in the sterilizer a little more than warm when placing the bottles in it, in order to avoid breaking them. This recipe makes sufficient soup for 16 persons. (Secretary, Mrs. W. D. Kekwick.)

LAURA BAY, April 9th.

Hints.—Paper by Mrs. J. Blumson:—1. Equal parts of glycerine and methylated spirits mixed together and rubbed well into the feet, morning and night, will banish corns, callouses, and even bunions, if persevered with, and fatigue will disappear. I found castor oil cured callouse on soles of feet, and after four years they have not reappeared. 2. When plucking a fowl add ½ teaspoon washing soda in the water in which it is scalded. The feathers will become so loosened that the labour of plucking will be minimised. 3. When cooking anything with an onion in it always add a teaspoon of sugar. This prevents the onion from "repeating." 4. Mix dates with your favourite jam, and a little dessicated cocoanut, and you will have a delicious filling for tarts. 5. Cabbage water should never be thrown away, as it contains valuable mineral salts. If not wanted for soup, use it for making gravy. 6. Use half milk and half cream in mixing a butter sponge cake. It makes the sponge twice as nice. 7. The healing properties of mutton fat cream, so often recommended for chapped hands, are enhanced by the addition of 1oz. Friar's balsam to each 1lb. of fat. Add balsam when

the mixture is just about to thicken, then stir in thoroughly. 8. When frying tomatoes, add a little sugar and a pinch of carbonate soda. 9. Cook "seven-year-old" beans with lid off the saucepan, and they do not lose their usual green colour. 10. To remove iron rust from cotton goods, dissolve 1 dessertspoon of cream of tartar in 1 quart of water. Put in the articles, which should be well washed and still wet, and boil till rust is removed—probably half an hour. 11. When using preserved eggs, always break the shells near the pointed end. The yolks are less likely to break. 12. Leave a thread in a needle when the latter is pushed into the pincushion. The needle will be less likely to slip through the cover, and should it do so, it can easily be pulled out by the thread. (Secretary, Mrs. R. W. Burke.)

O'LOUGHLIN.

March 21st.—Attendance, 12.

A collection of 3d. per nominee was taken for the purpose of providing prize-money for a competition on "Useful Household Hints," to be judged at the next meeting. Miss T. Hasting read a paper, "Home Nursing," in which she stated that since the depression many people could ill afford to pay a doctor's consultation fee or to pay for patent medicines. As a result in many cases very simple home remedies had been tried with excellent results. Great precautions should be taken to avoid all germs in the case of an epidemic. That could be done by means of lysol baths; also by dabbing the hair with lysol and thoroughly washing the hands. Germs could easily be killed in a home where there was an infectious case. The house should be fumigated by burning sulphur in the rooms, all windows and doors being closed and all ventilators and fireplaces blocked. Fireplaces could be closed by gluing a large piece of paper in front of each. An old bucket or piece of tin with some burning coals in it could be placed in the room, and about ½lb. of sulphur sprinkled on the coals. This should be left in the room for at least two hours, and would kill all germs. A simple way to check the spread of germs in a house was to saturate old rags with phenyle, and hang them over doors, windows, beds, and any other furniture. During the summer months, or after a long dry spell, all water should be boiled and only cold water drunk. Where a patient was very sick and refused food, the only strengthening and nourishing food was barley water. Where the patient could eat, the breakfast should be of light and digestible food, such as milk foods or stewed fruit, an egg lightly boiled or poached, or steamed fish with a little bread and butter. The mid-day meal could include clear broth, ample fresh green vegetables, a little grilled or roast meat and stewed fruit or egg custard. For the evening meal steamed chicken, brown bread and butter, a glass of milk and fresh fruit were recommended. In a case of diarrhoea, the patient should have only plain food, barley water and milk. If the milk was scalded, it should be only sipped, because drinking it fast often caused it to curdle into big lumps and so cause constipation. In cases of bleeding throats or any internal haemorrhage, only ice-cold drinks and ice-cold soft foods should be given, since the ice would chill the wound and clot the blood. *Simple Home Remedies.*—Severe nose bleeding could be stopped by placing a piece of butter on the head and then a cold wet cloth over the butter. The remedy had never been known to fail, even with the worst attacks. When a child or adult experienced the first symptoms of a cold or of influenza, immediate treatment should be given, in the form of a hot mustard foot bath, 2 aspirin tablets, and a hot lemon drink to which an eggcupful of rum or brandy had been added. If the throat was sore a cold compress should be applied to the neck and covered well with oiled silk and cotton wool. The patient should remain in bed for two days and be kept warm, in a room which was well ventilated. If the patient was restless, an onion sandwich or an onion inhaled would often produce sleep; lettuce would answer the same purpose. A good laxative for children was a warm drink sweetened with brown sugar. Another simple remedy for constipation in bottle-fed babies was to sweeten the food with a little golden syrup instead of sugar. A distressing cough could often be relieved by taking a tablespoonful of hot lemon and honey; if lemons were not available, vinegar would answer the same purpose. Pure lard was one of the best things to use in cases of burns and scalds; several applications would heal the wound. Sprains of similar swellings should be bathed frequently with hot salt water and massaged with methylated spirits and olive oil. (Secretary, Mrs. E. R. Pfeiffer.)

BOOR'S PLAINS (Average annual rainfall, 15.6in.).

April 4th.—Attendance, 20.

BUTTER MAKING.—Paper by Mrs. G. E. Rodda:—During the making of butter cleanliness is the most important part of the process. The hands should be washed before milking, also cows' teats. All dairy utensils must be kept very clean with soda washings. Always rinse in scalding water; put buckets and separator out in the sun—an excellent germ killer and sweetener. Before separating put through a little hot

water. Always turn the separator at the same pace; if not you will get different tests. Do not mix hot and cold cream together. You must wait until it has gone cold, then mix and stir all. Keep cream in a cold, draughty place. To have good butter, cream should be made into butter while it is fresh—allowing for weather conditions, about twice a week. Fairly thick cream gives the best results. Put salt with the cream into the churn at the rate of 1lb. of salt to every 10lbs. butter. Of course salting is a matter of taste. Work it until it reaches the crumbly stage. Add 1gall, or so of cold water. Work again, pour off, and repeat until the water is quite clear. Put in more salt if needed. The butter is then ready for pounding. Allow 1oz. to every pound of butter for shrinkage. An easy way to cover butter with paper smoothly is to dip the butter-papers in cold water before wrapping. (Secretary, Miss L. Stanway.)

PARILLA (Average annual rainfall, 14.01in.).

March 20th.

The subject of the meeting was "Vegetable Salads." The following recipes were collected:—*Carrot Salad.*—½lb. new carrots, 2 or 3 spring onions, 1 lettuce, 1 egg, mayonnaise sauce. Boil some new carrots. The number depends on size, but aim at about ½lb. in weight. Then place them on a dish to drain and cool. Skin, top, and tail the spring onions, and choose the best leaves of a cos lettuce. Boil the egg hard and wait for it to cool. Next slice the carrots, spring onions, and lettuce leaves, and blend with mayonnaise sauce. Put in a salad bowl and garnish with sections of hard-boiled egg. *Cabbage Salad.*—¼ heart of cabbage, 2 apples, 1 teaspoon capers, 1 tomato, 1 cooked potato, few lettuce leaves, mayonnaise sauce. This is an "All British" recipe, suggested by the Empire Marketing Board. Slice the potato, apple, and tomato. Shred the cabbage, pour over the mayonnaise, add the capers, and blend thoroughly. Serve on a bed of crisp lettuce leaves and decorate with half-slices of tomato. *Parsnip Salad.*—3 or 4 parsnips, parsley, salad dressing, 1 beetroot. Use cold cooked parsnips and similarly with the beetroot. Slice both and sprinkle with sprigs of parsley. Make a salad dressing of equal quantities of salad oil and vinegar. Mix with a spoonful of dry mustard and add a little pepper and salt. This salad is admirable when served with cold boiled meat and poultry. *Asparagus and Lettuce Salad.*—1 bundle of asparagus, mayonnaise sauce, 1 egg, 1 or 2 lettuces. First boil the egg hard and set it aside to cool.

Then cook the asparagus. When it has been cooled down, remove the portion of the stalks which cannot be eaten. Pick over and wash the lettuces. Select the light, crisp leaves and spread them on a dish. Arrange the asparagus on them and pour the mayonnaise sauce over them. Cut the hard boiled egg into sections, one for each person, and place them on a dish. It is not a bad plan to arrange the salad on several small platters, one for every person at the meal. *Bean Salad.*—Boil some French beans in salted water, cut in pieces, and garnish with tomato and parsley. Pour over boiled salad dressing. *Orange Salad.*—Cut some oranges in thin slices, also some onions. Arrange in dish and garnish with celery. Pour over French salad dressing. *Green Peas and Almond Salad.*—2 cups cold green peas, 1 cup of shredded blanched almonds. Fill cups of lettuce leaves with them, and pour on top a little American salad dressing, on top of which shred a very little finely chopped mint. *Waldorf Salad.*—Cut the apples after paring and coring in thin slices, and shred; add equal quantity of white, crisp celery. Cut in thin strips, too; chop up a handful of walnuts. Mix all well together, and cover with American salad dressing. *Beetroot and Macaroni Salad.*—Take equal quantities of cooked macaroni and cooked beetroot. Cut them into pieces, dress them with pepper, salt, oil, and Tarragon vinegar. It is well to arrange this dish some hours before it is wanted, so that the macaroni may become pink from standing with the beetroot. *German Salad.*—Slices of cold boiled potatoes, beetroot, carrots, tomatoes, shreds of lettuce; in short, all kinds of vegetables in season, all mixed together and covered with this salad mixture. Pound in a mortar the yolks of four hard boiled eggs (with a dessertspoonful of dry mustard if liked), adding drop by drop six tablespoonfuls of oil and three of vinegar. Work all together till smooth like cream. Add a little salt and pour over the salad. (Secretary, Mrs. R. E. Welden.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Rendelsham ...	1/5/35	10	Cooking Competition	Mrs. Z. A. Bignell
Sheoak Log	2/5/35	28	Papers from Blyth Conference	Miss K. M. Koch
Saddleworth ...	30/4/35	8	Conference Report	Miss G. E. Frost
Laura Bay	12/2/35	7	"Summer Drinks," Miss L. Blumson	Mrs. R. W. Burke
Maltee	25/4/35	10	Paper from *Journal*	Miss L. Bassham
McLaren Flat...	2/5/35	—	"A Trip to Sydney," Mrs. Foggo	Mrs. B. Powell
Balumbah......	1/5/35	8	Discussion—"Gardening"	Miss H. D. Jericho
Coonawarra	8/5/35	32	Butter Competition	Mrs. F. I. Skinner
Belalie	14 5 35	25	"Renewing Garments," Mrs. F. Cummings; "Salads and Savouries," Mrs. M. W. Bailey	Mrs. E. L. Orchard
Boor's Plains ..	2/5/35/	12	Bacon-Curing Demonstration—H. J. Apps	Miss L. Stanway
Williamstown...	1/5/35	4	"Show Exhibits," Mrs. Cundy	Mrs. G. E. Cundy
Monarto South .	18/5/35	17	Scone Competition	Mrs. F. W. Liebelt
Mangalo	8/5/35	12	Cake Competition	Mrs. F. Coles
Parilla	15/5/35	18	Mat-making Demonstration—Mrs. Wright	Mrs. A. W. Welden
Gladstone	21/5/35	35	"Show Exhibits," Mrs. Schmidt	Mrs. L. J. Sargent
Pinnaroo	3/5/35	25	Demonstration—Mrs. Pearce	Mrs. F. N. Atze
Snowtown......	2/5/35	18	Exchange of Plants	Mrs. A. Hocking
Kangarilla	18/4/35	8	Demonstration of Rug-making	Mrs. M. A. Steer
McLaren Flat...	4/4/35	21	Annual Meeting	Mrs. B. Powell
McLaren Flat...	30/3/35	—	Dahlia Show	Mrs. B. Powell
Yurgo	27/5/35	9	Homestead Meeting, Mrs. Jarrett	Mrs. R. E. Sanders
Hope Forest ...	7/5/35	22	Musical Afternoon.......	Mrs. L. Fincher

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

Vol. XXXVIII.	JULY 15, 1935.	No. 12.

Published Monthly by the Department of Agriculture.

Edited by H. C. Pritchard.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

Southern, at Mount Compass, Thursday, August 15th (Chas. E. Vercoe, Secretary).

Hills, at Lenswood, Thursday, August 22nd (B. F. Lawrance, Secretary).

Murray Lands (East), at Alawoona, Tuesday, October 1st (A. J. Pengilly, Secretary).

Fruit (Non-irrigated), at Lyndoch, Tuesday, November 5th (J. S. Hammat, Secretary, Williamstown).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

North-Western, Crystal Brook, Wednesday, September 4th.
Snowtown, Wednesday, September 11th.
Laura, Wednesday, September 25th.
Eudunda, Wednesday, September 25th.
Gawler, Saturday, September 28th.
Balaklava, Saturday, September 28th.
Waikerie, Saturday, September 28th.
Karoonda, Wednesday, October 2nd.
Streaky Bay, Wednesday, October 2nd.
Murray Bridge, Friday and Saturday, October 4th and 5th.
Kapunda, Saturday, October 5th.
Peterborough, Saturday, October 5th.
Kadina, Saturday, October 5th.
Jamestown, Wednesday, October 9th.
Loxton, Wednesday, October 9th.
Strathalbyn, Wednesday, October 9th.
Penola, Wednesday, October 9th.
Blyth, Saturday, October 12th.
Moonta, Saturday, October 12th.
Pinnaroo, Wednesday, October 16th.
Saddleworth, Wednesday, October 16th.
Mount Remarkable, Wednesday, October 16th.
Maitland, Wednesday, October 16th.
Clare, Saturday, October 19th.
Minlaton, Wednesday, October 23rd.
Mount Gambier, Wednesday and Thursday, October 23rd and 24th.
Burra, Wednesday, October 23rd.
Southern, Port Elliot, Saturday, October 26th.
Tatiara (Bordertown), Wednesday and Thursday, October 30th and 31st.
Millicent, Saturday, November 2nd.
Kingscote, Thursday, November 7th.
Kalangadoo, Saturday, November 16th.
Angaston, Saturday, February 29th, 1936.
Mundalla, Wednesday, March 4th, 1936.
Mount Pleasant, Thursday, March 19th, 1936.

Rabbit Poisons.

Replying to questions on the action of various poisons used for the destruction of rabbits, Mr. W. T. Rowe (Director of Chemistry) says:—

Strychnine is generally called a nerve poison and causes twitching of muscles, followed by convulsions and arched stiffening of the body. Death in a few minutes if poisonous dose absorbed.

Potassium Cyanide.—Death results from paralysis of the central nervous system. It also affects the red blood corpuscles, rendering them useless as oxygen carriers. It is very rapid in action, death taking place in a few minutes.

Arsenic is an irritant poison, and generally causes a painful death. Vomiting and diarrhoea are usual symptoms.

Carbon Monoxide.—This gas is absorbed by the red blood corpuscles and quickly renders them unfit to carry oxygen to the tissues. Death comes quickly and painlessly. It is the presence of carbon monoxide in coal gas that makes it poisonous. It is also contained in the exhaust gases from motor car engines.

Carbon Bisulphide is a liquid at ordinary temperatures, but gives off fumes which, in a confined space, are poisonous. The vapour of carbon bisulphide acts on the red blood corpuscles like carbon monoxide, although it is slower in action.

Calcium Cyanide in the presence of moisture emits prussic acid gas (*hydrocyanic acid*) and this acts in the same manner as potassium cyanide. Of course, if the solid calcium cyanide were swallowed, its action would be similar to potassium cyanide.

Arsenate of Lead—Analyses of Samples.

The Director of Chemistry has requested us to correct a mistake which occurred in a report from his Department in the figures showing the Five Minute Suspension Test of Arsenate of Lead Powders as published in the December, 1934, issue of this *Journal.* The Five Minute Suspension Test for "Orchard" brand of Arsenate of Lead powder should have been 77.3 per cent. instead of 27.3 per cent. The report should have read as follows:—

"The samples (6) of arsenate of lead powders, received on 12th November, 1934, No. 517, have been analysed with the following results:—

No.	Brand.	Moisture.	Total Lead. (PbO)	Total Arsenic. (As_2O_5)	Water Soluble Arsenic. (As_2O_5)	Suspension Test. Five Mins.	Suspension Test. Thirty Mins.
		%	%	%	%	%	%
1.	"Vallo"	0.52	64.0	30.9	0.11	32.8	10.7
2.	Hemingway's	0.53	64.4	31.4	0.14	83.0	60.3
3.	"Acro"	0.68	64.5	31.3	0.17	64.0	45.4
4.	"Lion"	0.27	64.0	32.0	0.11	25.6	9.0
5.	"Orchard"	0.27	64.2	32.8	0.11	77.3	52.8
6.	"Palmprest"	0.25	64.6	32.0	0.17	35.2	9.1

Weevil in Oats.

A delegate at the recent Ceduna Conference mentioned that there was a belief among some farmers that weevils did not cause much harm to oats from a germination point of view. Mr. R. C. Scott (Supervisor of Experiment Work) stated that, generally speaking, the *germ* in a weevil-attacked grain was not necessarily destroyed. If the damage was not severe, this portion might not be injured and was still viable. However, if the other material in the grain, which normally supplied foodstuff for the young plant until its own roots could function, had been consumed by weevil, then there must be very weakly development. The result was that, although these lightly-attacked grains might germinate, a high percentage would fail to survive and form healthy plants. On the other hand, in a badly damaged grain, the germ was totally destroyed, and, naturally, in such instances, no germination was possible. Consequently, for planting purposes, the result was much the same in both cases, and a grain attacked by weevil had practically no value for use as seed.

Publications Received.

The Library of the Department of Agriculture has received the following publications:—

"Variations in the Composition of Milk," Bulletin No. 16 (6d.).

"Green Peas," Bulletin No. 81 (1s. 6d.).

"Pests and Diseases of Sugar Beets," Bulletin No. 93 (1s. 6d.).

Published by the Ministry of Agriculture, England.

Manual of Grasses of U.S.A.—A. Hitchcox (1 dollar 75 cents).

AGRICULTURAL INQUIRIES.

Dissolving Bones for Manure.

"Miltalie" asks the following questions:—"Is there any economical method of dissolving bones for manure; if so, what is the process and would such manure be equivalent to fine bone dust weight for weight?"

Reply—There is no economical farm method for the production of "dissolved bones" or "bone superphosphate" for manure. If it is desired to produce "bone superphosphate" on the farm the following is the proportion in which the materials are used:—40lbs. bone ash, 10lbs. (1gall.) water, 15lbs. of strong sulphuric acid (S.G. 1.832). Pour the water into a wooden or lead-lined trough, and add the sulphuric acid slowly with stirring. (If the water is poured into the acid an explosion will result.) Gradually add, with stirring, the bone ash. A doughy mass forms, and this will dry in several hours to a friable bone superphosphate which will break up finely. Burning the bones to form bone ash is the only method which could be used on the farm to remove all the fat completely. If the fat is not removed from the bones the action of the sulphuric acid is interfered with and a slimy mass very difficult to dry and handle results.

On the farm, excluding labour, carriage of the acid (which is very high), and the materials used other than the acid, £4 will buy sufficient sulphuric acid for one-third of a ton of 50 per cent. bone superphosphate. On the other hand, at present market rates, £4 will buy 1 ton of 45 per cent. superphosphate. Average bone dust sold on the market contains about 40 per cent. ordinary or tri-calcic phosphate and 3.5 per cent. nitrogen. The tri-calcic phosphate of bone-dust is less active than the water soluble mono-calcic phosphate of bone superphosphate. In addition, the nitrogen of bone dust only slowly becomes available as compared with, say, the nitrogen in sulphate of ammonia.

Thus, on weight, considering only the phosphate content, 1½ tons of bone dust would be equivalent to 1 ton of the bone superphosphate. On heavy soil in spite of its nitrogen content, bone dust shows no superiority over bone superphosphate containing an equivalent amount of phosphate, either in immediate or residual effect. On lighter soils not well supplied with lime, bone dust is superior to bone superphosphate for intense culture.

Oats *v.* Wheaten Hay Chaff for Sheep.

"How many bushels of oats would be equivalent to 1 ton of best green wheaten hay chaff for hand feeding sheep where the roughage in the paddock is sufficient for handfeeding with oats?"

Reply—The following are the analyses of green wheaten hay chaff and oats:—

	Digestible Protein. Per cent.	Digestible Fat. Per cent.	Digestible Fibre. Per cent.	Digestible Carbohydrate. Per cent.	Starch Equivalent. Per cent.
Hay	4.0	.4	12.9	29.9	31.4
Oats	8.0	4.0	2.6	44.8	59.7

From these analyses it can be seen that the best green wheaten hay chaff would have approximately half the feeding value of oats. Thus with a sufficiency of roughage —the paddock 28bush. of oats could be used in place of 1 ton of the best green hay chaff for hand feeding sheep.

Viability of Oats.

"Will seed oats keep their germinating powers for, say, 2 years under slightly damp conditions in an underground silo?"

Reply—Under these conditions due to fungal and/or weevil development, there would be a decrease in the germinating power of oats, the decrease depending on the extent of this development. A common site of fungal devlopment is the soluble sugar layer around the germ. Development here would kill the germ resulting in non-germination. Such conditions are conducive to weevil attack which may result in a proportion of germ injury, thus further decreasing the germinating powers of the oats.

Feeding Value of Pie Melons.

"What food value to stock is there in pie melons and what is the percentage of water?"

Reply—Pie melons contain about 91 per cent. water and 9 per cent. dry matter. The dry matter contains about 1 per cent. digestible protein, 5.8 per cent. digestible carbohydrate, and .3 per cent. digestible fat. This would have a starch equivalent of about 7.4. Thus it has about one-eighth the feeding value of, say, oats which has a starch equivalent of 59.7.

[Replies supplied by Mr. R. C. SCOTT (Supervisor of Experimental Work).]

Preparing Land for *Phalaris tuberosa*.

"Milang": "What soil preparation is necessary for 'Phalaris tuberosa'?"

Reply—This crop is best planted alone on a well prepared area of land which is free from weeds. *Phalaris tuberosa* is very delicate in its early stages of growth, and will not withstand competition from either weeds or other pasture plants sown in conjunction with it. However, when once established it can withstand both competition and heavy

grazing. Very satisfactory stands have been secured in this State by planting *Phalaris* by itself and adding clover in the second year.

The food value of this fodder is quite good, and stock do well on it, although it is sometimes reported that it is not particularly palatable to the animals at first. In planting the crop, old clover land is preferable to relatively infertile areas and at least 1cwt. superphosphate to the acre should be applied.

Phalaris tuberosa is a perennial plant, and a well established stand will persist for many years.

Nauru Phosphate Rock.

The Secretary of the Black Springs Branch of the Agricultural Bureau asks: "How is the phosphate rock on Nauru formed?"

Reply—The generally accepted theory regarding these deposits is that original guano in the form of bird excreta, &c., must have been deposited many thousands of years ago. It has been proved that the islands have been submerged on a number of occasions and fish bones, shark teeth, &c., are frequently discovered.

Because of the inundations all impurities have been washed away, and practically only the pure phosphate remains, some of which is hard and rock like, but the majority is in the form of a light brown friable material.

The chief difference between this and our local phosphate rock is that the latter is relatively impure, containing a low percentage of phosphoric acid.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Secretary Agricultural Bureau, Wasleys, reports mare whose foals suffer from constipation from birth.

Reply—There is no specific way of treating the mare before foaling, excepting that it is advisable to see that her diet should be laxative. With respect to the foal, it is very important that the young animal should be got to suck quickly after being "dropped," as a good drink of the colostral milk of the mare is essential to promote proper bowel functioning in the foal. Should a definite constipation arise, the most satisfactory way of treating the foal is to give repeated copious enemas of warm soapy water into which some olive oil has been well mixed. The injections must be made very carefully in order to avoid seriously injuring the bowel wall; the best appliance to use is an ordinary Higginson's rubber bulb enema syringe. The young animal could next be given a dose of 1oz. each of castor and olive oils—mixed together—adding a dose of brandy if a stimulant is indicated.

Secretary Palabie Agricultural Bureau reports cows chewing wood.

Reply—Depraved appetite in cows is usually a sympton of want of sufficient nourishment, chiefly proteins and mineral matter. Supply better feeding, and give 2ozs. of following mixture in feed daily:—Dicalcic phosphate, 40 parts; salt, 60 parts.

Secretary Blachheath Agricultural Bureau reports pigs losing the use of their hind legs,

Reply—This is due to a deficiency in their diet of a vitamin, and will respond to the following treatment:—If possible, supply affected pigs with cow's whole milk—not separator milk—in addition to the grain rations. In any case, give one dessertspoon of cod liver oil per day to each pig for at least fourteen days. If any carrots are available, slice them longways and give once a day. The following mineral mixture should be available at all times:—Sweet bone meal, 10lbs.; charcoal, 10lbs.; common salt, 1lb.

THE RELATION OF PASTURE DEVELOPMENT TO ENVIRONMENTAL FACTORS IN SOUTH AUSTRALIA.

[By H. C. TRUMBLE, M.Agr.Sc., Agronomist, Waite Agricultural Research Institute.]

(Paper read before Section K of the Australian and New Zealand Association for the Advancement of Science, Melbourne Meeting, January, 1935.)

1. Introduction.

The development of natural and seeded pastures has received material investigation in South Australia during the last five or six years, and the present would seem a suitable opportunity to review some of the results obtained and to attempt their interpretation in the light of several basal controlling factors.

The data concerned, while to some extent diverse, has been obtained entirely within the State of South Australia. It is possible, however, that the results may have some bearing on other portions of the Commonwealth, especially where related conditions of climate and soil prevail.

The botanical nature and productivity of pastures in South Australia are governed, as in all regions, by immediate climatic, soil and biotic circumstances. It is exceedingly difficult, if not impossible, to obtain a single measure of all the factors concerned. A composite reflex of the native environment may be found, however, in the type of vegetation which has naturally developed to a comparatively stable or climax condition with the passage of time. It is reasonable to suppose that a close inter-relation will exist between the type of climax vegetation induced by the native environment and the types of natural and seeded pastures produced by essentially the same climatic and edaphic conditions, although by very different biota. The practical and utilitarian value of such a relation lies in the indication which the climax vegetation supplies regarding the types of pasture for which the land is suitable.

Much information collected by botanists, explorers, pioneer-farmers and surveyors has been systematized by Prescott (3) who has related the major types of vegetation in Australia to soil and climatic conditions. From the grassland point of view, however, little has been done to relate natural and seeded pastures to climax vegetation types or to environmental factors.

The climatic conditions of South Australia are distinctly less favourable than in most other regions where pasture development has progressed. The western, northern, eastern and central areas of the State are arid, the mean annual rainfall in most places being substantially less than ten inches. These areas consist of desert, semi-desert with mulga and myall, saltbush, bluebush, various scrub types and some mallee. Indigenous species predominate, with exotics providing comparatively little of the fodder supply. The arid portion outside the 10in. isohyet covers 83 per cent. of the State and carries 21 per cent. of the sheep, 18 per cent. of the cattle and 5 per cent. of the horses maintained by the whole.

The area receiving more than 10ins. per annum is 65,000 square miles. Only 15,000 square miles receive 18ins. or more; less than 5,000 square miles receive 25ins.

The climatic conditions of the southern area are essentially of the Mediterranean type. The rainfall occurs mainly in winter; the winter temperatures are mild and the summers hot and dry. It is of interest to note that the majority of exotic species found in southern grasslands—most of them annuals, with a moderate sprinkling of perennials—are indigenous to Mediterranean countries or to

the Cape Province of South Africa. Common examples are silver grass (*Festuca myuros*), barley grass (*Hordeum murinum*), cape weed (*Cryptostemma calendulaceum*), wild geranium (*Erodium* spp.), cat's ear (*Hypochaeris radicata*) and many of the annual clovers and trefoils.

2. Location and Nature of Grazing Areas.

The location of grazing areas may be indicated fairly precisely by dot dispersions of livestock. These indicate not only the limits of the pastoral and agricultural holdings but the relative intensity of stocking from point to point.

The separate distributions of wheat, sheep and cattle were plotted for Australia by Thomas (5) as early as 1922. The distribution of livestock as a whole, for any portion of Australia, however, has not previously been plotted on one map; nor has this distribution been correlated with the natural vegetation. In the present instance the distribution of sheep, cattle and horses, prepared from the official statistics for district councils, hundreds and pastoral holdings has been superimposed on a map of the major vegetation associations of South Australia, from the recent work of Prescott (3) and of Wood (7). The preparation of a composite map was prompted by the necessity for a delineation of the grazing areas within each major type of vegetation and the provision of a basis for the study of the pastures of these areas in relation to their environment. Owing to the reduction in size of the original copy of the accompanying plate, the distribution of sheep only is shown. A limited number of enlarged copies of the original may be obtained on request to the Waite Institute.

For suitable treatment from the pasture viewpoint, nine major types are defined:—

(1) *Desert*—consisting mainly of sand, with porcupine grass (*Triodia* spp.) and ironstone gravel.

(2) *Semi-desert with Acacia scrub*—mulga, myall, gidgea, with associated saltbush, spear grass, Mitchell grass, etc.

(3) *Saltbush steppe*—dominated by saltbush and bluebush shrubs. In South Australia the saltbush and desert scrub areas carry 1,900,000 sheep, or 25 per cent. of the total, 61,000 cattle (20 per cent.), and 13,000 horses (7 per cent.).

(4) *Mallee*—characterized by comparatively dense associations of dwarf *Eucalyptus* scrub. The mallee areas of South Australia are important agriculturally and support 23 per cent. of the sheep, 20 per cent. of the cattle, and 44 per cent. of the horses of the State.

(5) *Dry savannah woodland*—a savannah type intermediate between the parklike formation of a typical savannah woodland and mallee scrub. The dominant species is *E. odorata* (peppermint), but the trees possess the typical mallee habit of branching at the base.

(6) *Savannah woodland*—comprising *E. odorata* and *E. leucoxylon* (blue gum) associations.

(7) *Sclerophyll forest*—*E. Baxteri* and *E. obliqua* (stringy bark), *E. fasciculosa* (pink gum), *E. rostrata* (red gum), etc.

(8) *Heath and sclerophyll scrub*—an edaphic sub-climax of sclerophyll forest and mallee.

(9) *Irrigation and "soak" areas*—these include the River Murray irrigation areas and areas of natural soakage where the accumulation of underground water enables deep-rooted herbage plants, such as lucerne, to be grown.

The areas of sclerophyll forest, savannah and dry savannah woodland, together with the irrigation and "soak" areas carry the greatest intensities of livestock, particularly sheep and cattle. These areas together support approximately half the sheep and horses and rather more than half the cattle of the State.

The numbers of livestock located within each main type of environment during the 1932-33 season are given in the following table:—

TABLE I.—*Showing numbers of sheep, cattle, and horses in the areas of Acacia scrub, saltbush, mallee, dry savannah woodland, savannah, sclerophyll forest, heath and irrigated cum "soak" areas in South Australia during the* 1932-33 *season.*

	Number of Livestock.			Percentage of Total.		
	Sheep.	Cattle.	Horses.	Sheep.	Cattle.	Horses.
Acacia semi-desert scrub	890,000	51,000	9,000	11·5	16·3	4·7
Saltbush	1,010,000	10,000	4,000	13·1	3·2	2·1
Mallee	1,780,000	63,000	84,000	23·1	20·2	44·3
Dry Savannah woodland	910,000	32,000	27,000	11·8	10·2	14·2
Savannah	1,120,000	74,000	36,000	14·5	23·6	19·0
Sclerophyll forest	1,390,000	55,000	16,000	18·0	17·6	8·4
Heath and sclerophyll scrub	160,000	2,000	1,000	2·1	0·6	0·5
Irrigation and " soak " areas	450,000	26,000	13,000	5·8	8·3	6·8

3. Fluctuations in Numbers of Livestock.

Over the 1913-33 period the numbers of sheep have increased, apart from temporary seasonal fluctuations, by a real amount of approximately two millions, despite an increase of 2 million acres in the area cultivated for cereals. Cattle have decreased slightly, and the number of horses has decreased materially.

These fluctuations have not tended to take place uniformly over all parts of the State. The areas of forest, woodland and mallee have increased in both sheep and cattle, whereas, apart from the north-western area, much of which has been opened only recently, the saltbush and desert-scrub areas have tended to decrease in all three classes of livestock.

Least fluctuation in the numbers of livestock from year to year occurred in the central and south-eastern areas of forest and savannah, whereas the greatest relative fluctuations have occurred in the saltbush and desert-scrub areas.

4. Nature of the Main Pasture Types.

The indigenous flora provides the principal pasturage for stock in the areas of desert scrub and saltbush steppe. The perennial species appear to be necessary for stability and sustained production in these areas. Under continued grazing and the depredations of rabbits, the effects of which are particularly serious in drought years, much country that formerly supplied good pasture has reverted or is reverting to desert. A flush of herbage usually follows infrequent liberal rains but this is short-lived in nature. The exotic species which occur are mainly of the desert ephemeral type, a notable example being "Arabian grass" (*Schismus barbatus*) which is said to have been introduced into Central Australia by Afghan camel drivers and has spread thence to various parts of the Commonwealth. The grass is dwarf, short-lived and free-seeding, yielding numerous seedlings which form a dense carpet of short pasture in early winter. It appears to be best suited to the lighter soil types. Whilst this species is an inferior grass compared with many other exotic annuals, it provides pasturage where otherwise feed would be absent, and has spread rapidly in recent years, over much mallee and saltbush-mallee country in South Australia. It may now be found over a great deal of the Murray mallee, and must be regarded as a valuable grass in these areas.

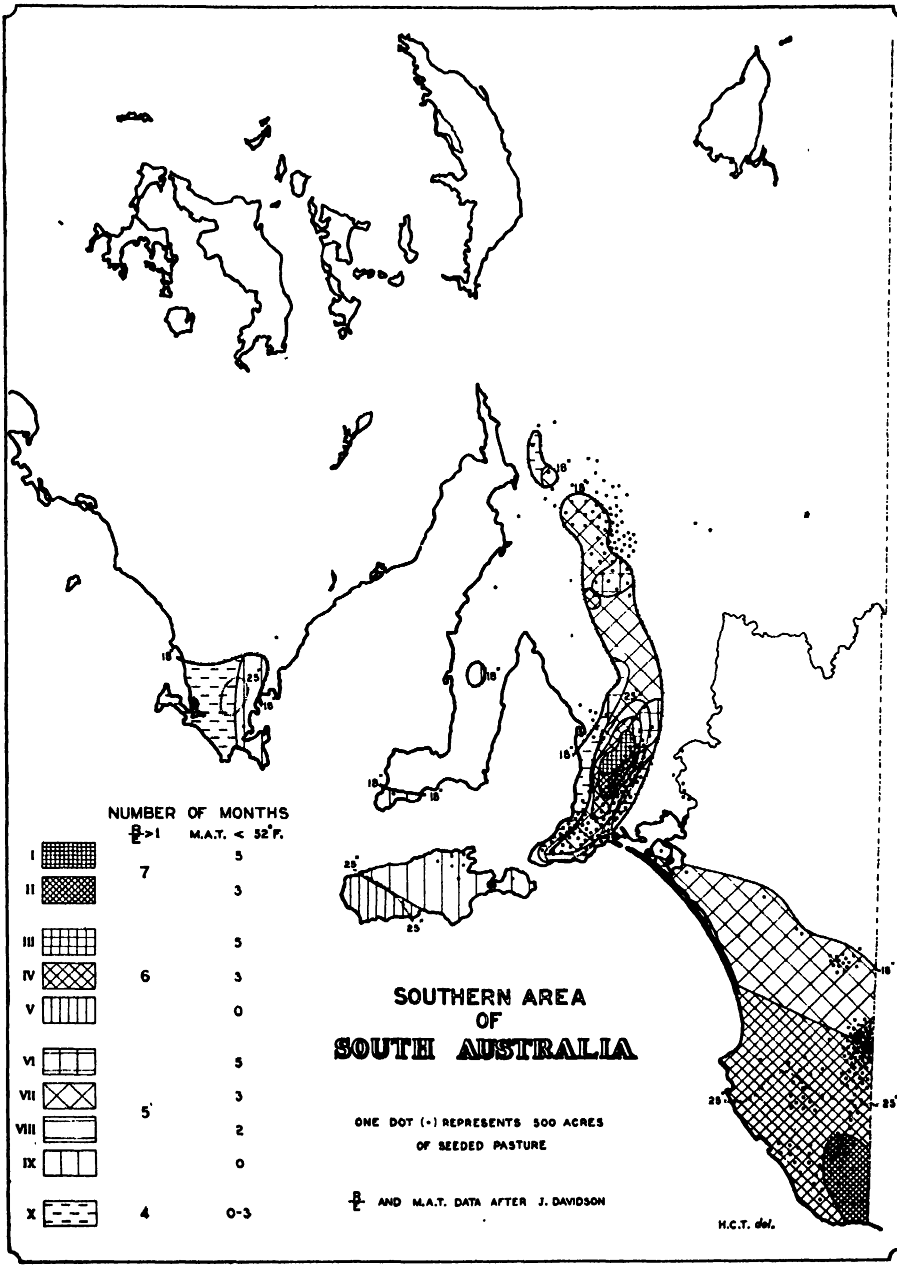


Figure 1.—Southern area of South Australia, showing the relation of seasonal moisture and temperature conditions to the distribution of seeded pastures. The length and nature of the growing season are largely dependent on the total rainfall (indicated by the 18in. and 25in. isohyets), the period over which rainfall exceeds evaporation, and the degree of coldness in winter (indicated by the period over which the mean air temperature is less than 52°F.).

Apart from the ecological work at Koonamore, which has been carried out in some detail, these areas have been little investigated from the pastoral point of view and there appears to be little immediate scope for economic pasture improvement. In general, deterioration has occurred fairly widely in the older settled areas.

The pastures of the *Eucalyptus* areas, including the mallee, savannah and forest types, have been derived mainly as a result of clearing. In the areas of peppermint (*E. odorata*) and the various mallee types (*E. oleosa, E. dumosa,* etc.), *Stipa-Danthonia* associations are common in the natural grassland formation, but under agricultural conditions, rapidly give way to exotics of the ephemeral type.

In the areas of sclerophyll forest (*E. obliqua, E. cosmophylla, E. Baxteri,* etc.) and blue gum (*E. leucoxylon*), kangaroo grass (*Themeda triandra*) is common after clearing but soon disappears under grazing; survivals are conspicuous in areas protected from stock. The erect sparsely-tillered spear grasses (*Stipa* spp.) and *Agropyrum scabrum* also disappear fairly rapidly. Wallaby grass (*Danthonia* spp.), *Microlaena stipoides* and *Eragrostis* spp. are capable of withstanding considerable grazing from sheep owing to their capacity for tiller production, and, in the absence of cultivation or the competition factor, frequently dominate the sward.

The carrying capacity of the perennial indigenous pastures varies in general from a sheep to four acres to two sheep per acre. *Danthonia* types occur throughout all of the woodland areas. The *Stipa* types become less important with increasing rainfall, however, whereas *Eragrostis* and *Microlaena* occur mainly within sclerophyll forest. The *Danthonia-Eragrostis-Microlaena* type of pasture is associated with a long season of moisture excess, and carries up to two Merino sheep per acre in the natural state. The pasture frequently remains green throughout the year, the period of minimum production being in winter.

5. Investigations of Unfertilized and Top-dressed Natural Pastures.

Natural pastures of the *Danthonia* type have been investigated in much detail at the Waite Institute, Glen Osmond, and at Kybybolite in the South-East, the greater portion of the work having been caried out by Davies, Scott and Fraser (2). At Glen Osmond, a typical indigenous pasture of the foothills, when allowed to remain in an unfertilized but grazed condition for ten years has been found to vary in *Danthonia* content from 20 to 65 per cent., at the completion of growth in November. At Kybybolite, with a longer growing season, but a much poorer soil, the content of perennial grasses (principally *Danthonia*) in November varied from 36 to 55 per cent. over four seasons. At each centre, the percentage of indigenous perennials was materially higher in the earlier part of the season.

At the Waite Institute, natural pastures were found to carry one Merino sheep per acre per annum, the mean annual return over a three-year period being 13.9lbs. of 64's quality wool per sheep and per acre. Where the pasture was top-dressed with superphosphate at the rate of 185lbs. per acre per annum, the carrying capacity was increased to 1.6 sheep per acre per annum and the wool production per acre to 22.1lbs. of 64's quality wool per acre, the yield of wool per sheep remaining the same as on the unmanured pasture. At Kybybolite, the production of wool per acre averaged 8.2lbs. for two seasons on unfertilized pasture and 19.5lbs. on pasture top-dressed with superphosphate. The further addition of lime increased the wool yield per acre to 26.5lbs. per acre. In all cases the increases in wool yield were directly due to increases in carrying capacity and not to any increase in production per sheep.

At both centres the original *Danthonia* pasture became dominated by miscellaneous annual plants, many of which are of doubtful value and poor stability. Examples are silver grass, geranium, barley grass, the bromes and the poorer annual clovers. An annual pasture of this nature tends towards poor autumn and winter production with a marked flush in spring. At Kybybolite, superphosphate increased the yield of pasture only 5 to 7 times in July compared with 10 to 20 times in November. In terms of carrying capacity, superphosphate increased the stock carried per acre from 0.75 sheep to 2.5 sheep in five years; that is to say, the number of sheep carried was slightly more than trebled. During the first three years of top-dressing, however, only 1.2, 1.8 and 2.1 sheep were carried during each successive season.

6. The Effect of Rainfall Incidence on the Yield of Natural Pastures.

The total yield produced by a natural pasture, whilst limited initially by low soil fertility, and under top-dressing by its botanical nature, is closely dependent on rainfall, and in particular on autumnal rains.

At the Waite Institute, the annual yields from both unmanured and top-dressed natural pastures over the 1925-34 period have been correlated with (*a*) total rainfall, (*b*) various types of seasonal rainfall, taken in groups of six, three and two months. The results are given in Table II.

TABLE II.—*Correlation coefficients (corrected) for the annual yield of* (a) *unmanured natural pastures,* (b) *top-dressed natural pasture, with annual and seasonal rainfall.*

RAINFALL PERIOD.

Annual.	Half-yearly.	Quarterly.	Bi-monthly.
	(a) *No fertiliser.*		
		Feb.-April +·73***	Mar.-April +·82**
		Mar.-May +·93*	April-May +·89*
	Jan.-June +·91*	April-June +·96*	May-June +·85*
Jan.-Dec. +·90*		May-July +·85*	June-July +·41
	July-Dec. —·62	June-Aug. +·44	July-Aug. +·10
		July-Sept. +·04	Aug.-Sept. —·09
		Aug.-Oct. —·25	Sept.-Oct. —·26
	(b) *Top-dressed with superphosphate.*		
		Feb.-April +·78***	Mar.-April +·89*
		Mar.-May +·91*	April-May +·88*
	Jan.-June +·89*	April-June +·95*	May-June +·78***
Jan.-Dec. +·88*		May-July +·72***	June-July +·33
	July-Dec. —·60	June-Aug. +·35	July-Aug. —·02
		July-Sept. —·18	Aug.-Sept. —·21
		Aug.-Oct. —·26	Sept.-Oct. —·29

Significance of the correlation coefficient—

* $P < \cdot 01$ ** $P < \cdot 02$ *** $P < \cdot 05$

NOTE.—Thanks are due to Mr. E. A. Cornish, B.Agr.Sc., for assistance with the determination of the "r" values. The seasonal trend of the correlation coefficient is of considerable interest and will be dealt with in a further publication.

The results of this examination point very strongly to the significance of the autumnal rains in determining the annual yield of the untreated and top-dressed natural pasture. The commencement of these autumnal rains is termed the "break" of season in South Australia, and most frequently occurs in early May. The importance of rains in autumn lies in their coincidence with relatively warm

soil temperatures, resulting in rapid growth prior to the cold temperatures of winter. A secondary effect occurs during the winter itself, when materially greater development is made possible by the greater range of root exploration resulting from vigorous early growth. The advantage of deeper and more abundant root development during winter is at least three-fold, permitting root activity in a region of more favourable soil temperature, affording greater opportunities for the assimilation of partially leached nitrates and giving increased scope for respiration. The advantages of early rains are well known in respect to crops sown for grain. They apply to temporary and permanent seeded pastures, both of which benefit greatly from early seeding, provided competition from weed development is not too severe. It is probable, of course, that spring rains will prove of greater importance with seeded pastures owing to the longer growing season.

It is of interest to note that the mean rainfall for the April-June period, over a sequence of ten years, is 8.03ins. Investigations of the water requirements of the pasture species concerned, carried out at the Waite Institute, show that the transpiration ratio for these plants approximates to 400.

Applying this value to the mean April-June rainfall figure of 8.03ins, the quantity of air-dry herbage produced would be 45.37cwts. per acre, which is slightly in excess of the mean yield per acre (42.90cwts.) actually obtained on the top-dressed plot over a period of ten years. The mean rainfall occurring in the April-June period, whilst only one-third the mean annual rainfall, thus provides the transpiration requirements of the mean yield of herbage recorded, and much of the rain which falls after June must be of very little use to unmanured or top-dressed natural pastures in the Waite Institute type of environment.

7. The Trend from Indigenous to Exotic Pastures.

General observation within the agricultural areas indicates that cultivation tends inevitably to eliminate the indigenous grassland species. Additional agents of suppression are the close grazing habits of European animals and the plant competition factor, provided by numerous introduced plants. The latter is stimulated by the application of soluble phosphate, resulting in the rapid reduction and frequent elimination of indigenous types from top-dressed land.

Owing to the marked tendency of the indigenous grasses to disappear with agricultural progress, and the readiness with which the areas of maximum stock concentration have become populated by exotics, the herb-flora of foreign winter rainfall areas, and the Mediterranean region in particular has assumed a special significance in the development of pastures in South Australia.

Unfortunately, most of the naturally occurring exotic species are decidedly inferior, as judged by our accepted standards for cultivated pasture plants. It has been shown conclusively that the productivity of top-dressed natural pastures is greatly limited by the nature of the exotic species which compose them. In order to increase production to a higher level, it is necessary to employ plants of greater vigour and better quality. It goes without saying that plants of high productivity and good quality are best adapted to soils of moderate to good fertility.

Pre-eminent amongst our limited supply of superior herbage plants in South Australia is subterranean clover of the Mount Barker strain. This is well adapted to much of the South-East except on the black rendzina soils, where its place is taken by strawberry clover. On the Murray swamps it is replaced by white clover, on the Booborowie flats by lucerne, and at the Waite Institute and other areas where the spring conditions are normally too severe for ordinary subterranean clover, its place has been successfully taken by the early maturing Dwalganup strain. Legumes appear to be vitally necessary as the basis for pasture improvement in South Australia. This is because most soils of the

higher rainfall areas tend to be deficient in total nitrogen, whereas even the less common soils of good natural fertility tend to become deficient in available nitrogen in the absence of cultivation or a suitable pasture legume.

Both scientific investigation and practical experience have shown that the continuous growth of a pure legume year after year is not only inadvisable from the viewpoint of animal health, but is also an impossibility in practice owing to the increasing nitrogen level of the soil, and its increasing suitability for grasses and other non-leguminous plants. We thus find invariably in a pasture sown to pure clover, a conspicuous influx of naturally occurring weedy grasses and other plants within three or four seasons, and it is impossible to prevent these plants from entering the sward. This indicates the necessity for superior grasses such as the rye-grasses and *Phalaris tuberosa.* The particular value of these plants lies in their capacity to grow in association with subterranean clover, lucerne, white clover or strawberry clover, and to make use of the nitrogen accumulated by the legume, at the same time doing much to keep out inferior plants.

8. The Relation of Pasture Type to Environment.

Leaving out of consideration the areas of desert-scrub and saltbush, in which little improvement of the pastures has occurred, we are left with the irrigated and "soak" areas, and the natural forest, savannah and mallee types. From the agricultural point of view, this country may be classified into four broad classes:—

(*a*) Irrigated areas, capable of yielding a wide variety of products, watered chiefly from the Murray River.
(*b*) Areas of soakage or of high water table, well adapted to the growth of lucerne, and located principally in the Booborowie-Mount Bryan area.
(*c*) The well-defined areas of subterranean clover (Mount Barker type), which coincide closely with the areas of forest and blue gum savannah.
(*d*) The areas of cereal cultivation, located mainly within the peppermint, savannah and mallee types of vegetation.

(a) *Irrigated Areas.*

The only irrigable areas of any extent in South Australia are the flats bordering the Murray River. The reclaimed swamps of the lower reaches have attracted most attention from the grazing aspect, and until recently lucerne has been the principal fodder grown. The work of Trumble and Davies (6) has shown that a simple mixture of perennial rye-grass, cocksfoot, white clover and red clover is satisfactory for these areas and is more productive than lucerne under the conditions of a typical reclaimed swamp. It has been demonstrated that 20 sheep per acre per annum can be carried on a pasture of this type. Other species which have attracted attention are *Phalaris tuberosa,* sown with *Poa pratensis* and white clover, Yorkshire fog on low-lying and over-grazed areas, and suitably permanent strains of prairie grass. Up to the 1932-33 season, only 3,000 acres of seeded pasture had been established on these areas, many stock being supported by temporary forage crops.

(b) *Areas of soakage or of high water table.*

These areas are situated principally in the Booborowie-Mount Bryan district, east of the Flinders Range, approximately 100 miles north of Adelaide. There are also restricted areas in the Adelaide plains region, the upper South-East and isolated portions of the State. The majority of the lucerne is located in country receiving 15 to 20 inches mean annual rainfall. Maintenance of the stand appears to depend in most cases on subsoil moisture accumulated from the falls of previous seasons or from outside catchments, as the amount falling in one season is frequently insufficient to promote the growth obtained.

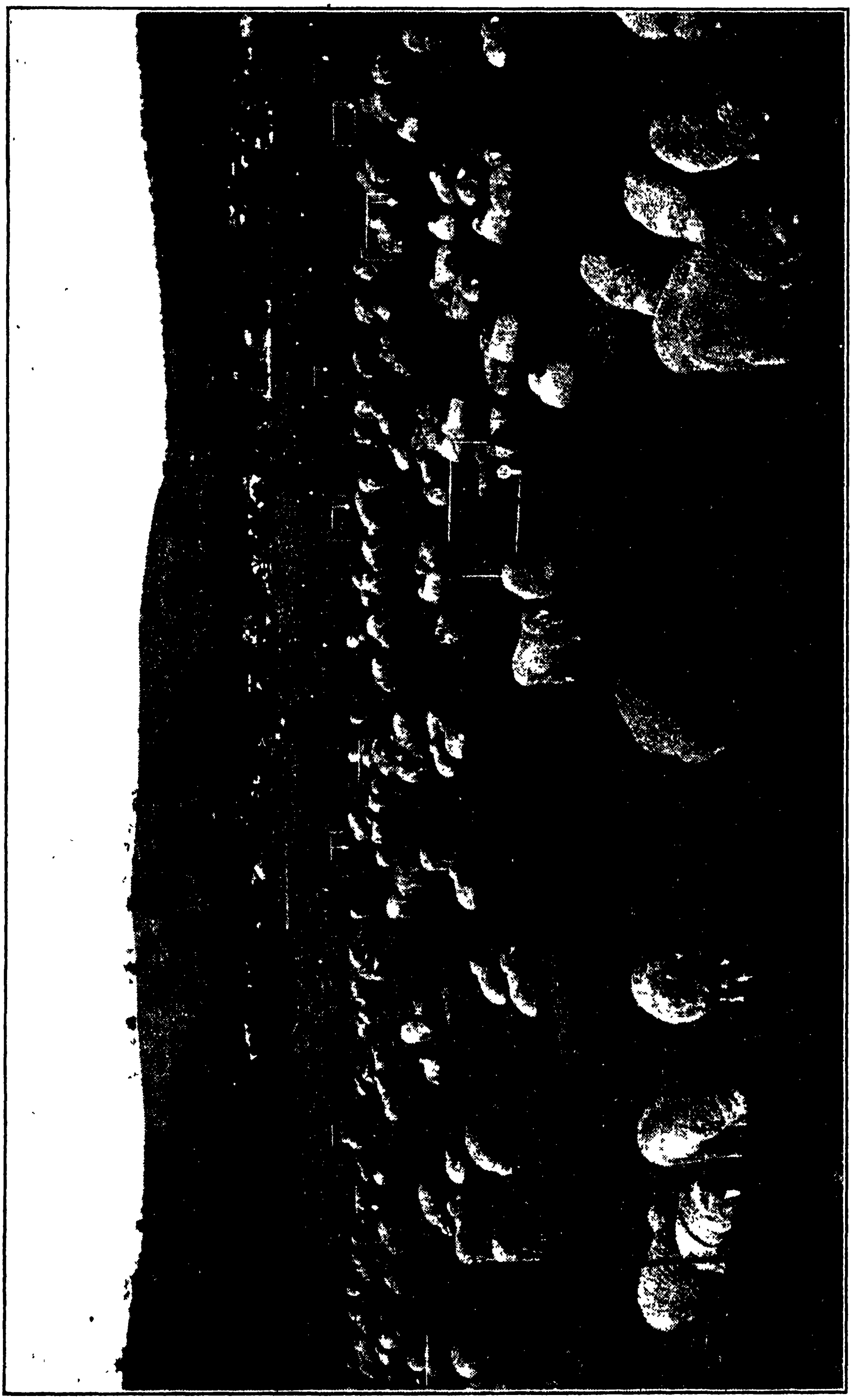


Figure 2.— Sheep grazing on a seeded pasture of *Phalaris tuberosa* and early flowering Subterranean Clover, at the Waite Institute, in the second year of the pasture, August, 1933.

DISTRIBUTION OF SHEEP IN SOUTH AUSTRALIA IN RELATION TO VEGETATION TYPES

VEGETATION TYPES AFTER J.G. WOOD AND J.A. PRESCOTT

H E POWELL GOVERNMENT PHOTOLITHOGRAPHER ADELAIDE

The development of lucerne from seed is usually slight in the first year but production is moderate to high in subsequent seasons. After two or three years, intrusion by barley grass and other non-leguminous annuals is usually evident particularly under grazing, and is probably a consequence of the increasing nitrogen level of the soil. There is scope for including light seedings of the more valuable non-legumes such as *Phalaris tuberosa* and the rye-grasses, with the initial seeding of lucerne. There is evidence that the lucerne stands in the Booborowie area are deteriorating owing to material reduction in the water table.

(c) *The areas of Subterranean Clover.*

Subterranean clover in conjunction with the use of superphosphate has provided the key to pasture improvement in the areas of sclerophyll forest and blue gum savannah. This plant was first exploited at Mount Barker, in an area of rolling savannah country on the eastern slopes of the main Mount Lofty Range. Since its introduction about 1880, it has spread naturally over much of

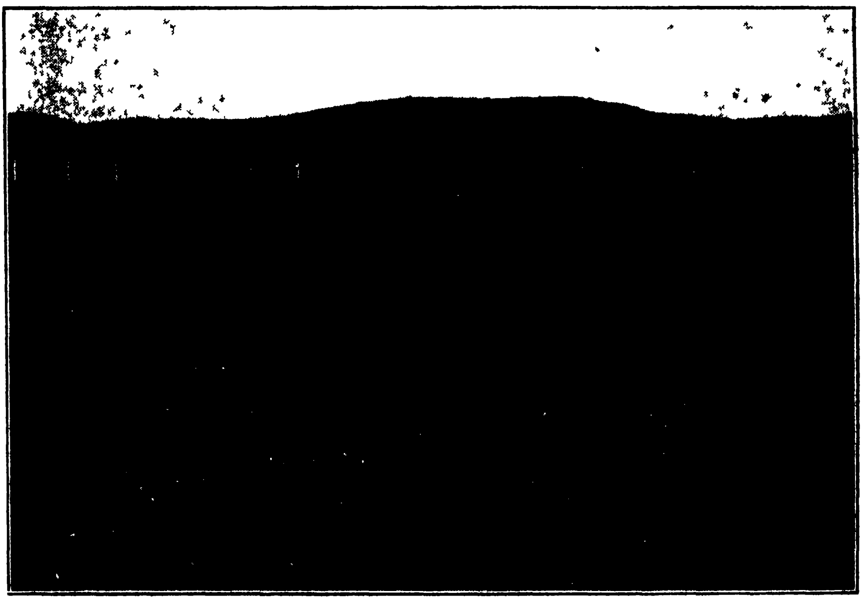


Figure 3.—General view of experimental plots at Mount Compass in the third season of the experiment, November, 1934.

the stringy bark-blue gum region, and attempts to establish it have been made in many grazing areas of the State. Its present distribution coincides closely with the limits of sclerophyll forest and blue gum savannah.

The most important factor in the development of subterranean clover has been the increased use of superphosphate. The soils of these areas for the most part tend towards the podsolized type and are low in both nitrogen and available phosphorus. Following two to four years of clover, a marked increase in non-leguminous annuals is evident as a result of an increased nitrogen level due to the clover. Silver grass (*Festuca myuros*) is the most common species and one of the first to appear. Others of frequent occurrence are soft brome (*Bromus hordeaceus*), barley grass (*Hordeum murinum*), wild oats (*Avena fatua* and *A. barbata*), shivery grass (*Briza minor*), Cape weed (*Cryptostemma calendulaceum*) and geranium (*Erodium* spp.).

B

In the Mount Barker district, where subterranean clover has been grown for many years, the pastures after passing through the annual phase have become populated to some extent by perennial rye-grass (*Lolium perenne*) and rib "grass" (*Plantago lanceolata*). Perennial rye-grass also occurs in the lower South-East particularly on the volcanic soils of good fertility and on soils improved by several years' growth of subterranean clover. *Poa pratensis* occurs along roadsides and in pastures in the forest and blue gum areas. These grasses, especially perennial rye-grass, were sown by early settlers of the State. In the limited areas of good soil fertility they have persisted. On the poorer soils they have tended to disappear temporarily but have increased during recent years on soils improved by clover.

Certain areas in this region have not grown subterranean clover satisfactorily. These are the black rendzina soils and glacial or quartzite sands of low moisture retentivity. Subterranean clover appears to be at its best on light, well-drained soils of good subsoil retentiveness. The swamp soils appear to grow strawberry clover (*T. fragiferum*) well. *Selliera radicans, Hypochaeris radicata* and *Hordeum maritimum* are also common on these soils.

A recent development in this region has been the establishment of sown grasses in association with subterranean clover. Suitable strains of perennial rye-grass, Wimmera rye-grass, and *Phalaris tuberosa* have proved adaptable to the climatic conditions of this area, and associate satisfactorily with the clover, tending to exclude to a marked degree the common inferior annual types. Yorkshire fog and *Phalaris* have established and grown satisfactorily with subterranean clover on podsols in wet districts (Figures 3-5).

(d) *The areas of cereal cultivation.*

Cereal cultivation in South Australia is carried out chiefly in the areas of peppermint (*E. odorata*), savannah and mallee (*E. oleosa, E. dumosa*). The soils vary from grey soils and red-brown earths to the lighter mallee soils. In the more productive wheat areas the soils are of good general fertility, with retentive clay or marl subsoils, but are comparatively low in available phosphate.

The rainfall conditions of these areas are less favourable than those of the forest and blue gum areas so far as pasture development is concerned. The total rainfall is rarely above 20ins.; the area of most intensive cereal development receives a mean annual rainfall of 16ins. to 20ins. The growing season is shorter than in the areas of subterranean clover; the months of September and October in particular tend to be definitely more arid.

The areas of peppermint-savannah may, from the pasture viewpoint, be regarded as neo-subterranean clover areas. This species when sown in these areas has usually failed to persist. At the Waite Institute, which is situated on the line of transition from peppermint to blue gum, very close to the 25ins. isohyet, systematic attempts to establish the clover have failed, whereas within the blue gum area less than two miles distant, subterranean clover grows naturally.

The reason for the failure of the clover in the cereal areas appears to be connected with the coincidence of its flowering and seed ripening—September to November—with a period of rapidly increasing temperature and increasing saturation deficiency.

Compared with the exotic annual species of the cereal areas, subterranean clover possesses an extended period of growth, involving in particular a long period from flowering to seed-maturity—approximately two months. Furthermore, its rate of transpiration is high during the post-flowering period, large quantities of soil moisture being required at that time. A deficiency of soil

Figure 4.—Close view (November, 1934) of a pasture seeded in 1932 with a mixture of Subterranean Clover and Yorkshire Fog, at Mount Compass.

Figure 5.—Close view (November, 1934) of a pasture seeded in 1932 with a mixture of Subterranean Clover and *Phalaris tuberosa*, at Mount Compass.

moisture within the root zone of the clover during the post-flowering period tends to inhibit normal development and promote death of the individuals before seeds are formed in sufficient quantity for satisfactory regeneration.

The solution to the growth of pasture legumes in the cereal areas appears partially to be provided by the use of earlier maturing strains of subterranean clover and, in certain areas, lucerne. The Dwalganup type of early subterranean clover, which first gave promise at the Waite Institute in 1929, has since proved a suitable type at several centres within these areas. This strain has been thoroughly tested and found to be persistent over a range of five seasons at the Waite Institute, Gepp's Cross, and Saddleworth, and has also shown a high degree of persistence following unfavourable spring conditions at Roseworthy College on the peppermint-mallee fringe.

Of the grasses, Wimmera rye-grass and *Phalaris tuberosa* appear to be the most suitable types. Additional non-legumes which have given good results in small trials at the above centres are perennial veldt grass (*Ehrharta calycina*), selected *Danthonia* strains and creeping saltbush (*Atriplex semibaccatum*). In the case of *Ehrharta* and *Danthonia*, however, practical disabilities arise in the fluffiness of the seed, which necessitates broadcasting by hand, and in the slow establishment of these grasses from seed. The types of seeded pasture which have tended to develop are grass *cum* legume combinations of early subterranean clover, lucerne, *Phalaris tuberosa*, Wimmera rye-grass. Low seeds rates of the order of 1lb. to 4lbs. per acre have given satisfactory results with these species.

Natural pastures in these areas are composed mainly of annual ephemeral types. Common amongst these are *Medicago* spp., principally *M. denticulata* (burr trefoil) which commonly develops on stubble, following the use of superphosphate with cereal crops. Barley grass (*Hordeum murinum*), wild oats (*Avena* spp.), wire weed (*Polygonum aviculare*), cape weed (*Cryptostemma calendulaceum*), the annual thistles and crucifers, and sour sob (*Oxalis cernua*) are common on cultivated land. These pastures are of a temporary nature and are frequently supplemented by the feeding down of crops and the use of grain, chaff, hay, and silage.

Throughout the dry savannah and mallee areas are found stretches of land not usually cultivated. Lack of cultivation may be due to a poor soil type, a steep or stony surface or distance from suitable transport facilities. *Stipa-Danthonia* associations are characteristic of these areas when cleared. Portions of this country could be ploughed once if suitable pasture types were available for establishment.

The ephemeral type appears to be well adapted and the early Dwalganup strain of subterranean clover is the most promising of the types at present available.

9. The Relation of Seeded Pastures to Climatic and Soil Factors.

The area of artificially seeded pastures is small in proportion to the total area of land grazed. Up to the 1932-33 season, 208,418 acres had been sown. Material increases in the area established have occurred since 1923-24, principally since 1928-29.

The distribution of sown pastures in relation to total rainfall, seasonal rainfall-evaporation ratio and mean air temperature is shown in Fig. 1 (page 1463). The rainfall isohyets are taken from the most recent data of the Commonwealth Meteorological Bureau; the rainfall-evaporation and temperature data are taken from C.S.I.R. Bul. 79 (1); the writer is indebted to Dr. Davidson for the use of his original graphs.

The dot dispersions for seeded pasture fall into two main groups:—

(1) Subterranean clover pastures: located principally within the areas south and east of Adelaide (34.9°S.).

(2) Lucerne: located principally north of Adelaide and most particularly in the Booborowie-Mount Bryan area.

There are also limited areas of permanent seeded grass mixtures along the Murray River and in the subterranean clover districts.

The area sown to subterranean clover is greater than that sown to lucerne and grass-clover mixtures combined. The main areas are in the South-East of the State principally in the Kybybolite, Kalangadoo, and Mundalla districts, and in the Mount Barker, Woodside, Meadows, and Myponga areas of the Mount Lofty Ranges.

These areas receive an average rainfall of 25ins. or more in the Mount Lofty Ranges and 18ins. or more in the South-East. In all cases rainfall exceeds evaporation for September (the month of maximum flowering of the clover) and in many cases for October as well. At least five months of the year are characterised by an excess of rainfall over evaporation. A favourable balance between available soil moisture supply and transpiration as influenced by the atmospheric environment appears to be indispensable during the post-flowering period of the clover. Favourable conditions usually obtain in the established clover areas but the balance is adverse during September and October in the cereal areas. In the latter the earlier strains of subterranean clover, by flowering in early August, secure favourable moisture relations during their post-flowering period and are able to produce sufficient seed for regeneration. In both the late and early strains, provision against unusually adverse seasons is made by the production of an appreciable proportion (10 to 40 per cent.) of hard seeds resulting in delayed germination and a series of seedling plants establishing over several seasons, from one year's seed production.

It is of interest to note that the areas of maximum subterranean clover development have relatively warm winter conditions. Thus in the majority of cases only three months of the year are characterized by a mean air temperature of less than 52°F. Where this period extends to five months in the Mount Lofty Ranges there is a falling off in subterranean clover concentration.

There are certain areas north of Adelaide, through Kapunda and Saddleworth, in which the general climatic conditions as indicated in Fig. 1 closely resemble those of the Mundalla area, in the upper South-East. Subterranean clover has not developed in these northern areas, however, and the reason is closely associated with soil conditions. The soils of the agricultural areas north of Adelaide are either relatively heavy in texture or tend to set when dry, or are granitic with poor moisture retentiveness. On the other hand, the South-Eastern soils are lighter and more friable, with excellent subsoil retentivity. The September-October conditions are also rather more favourable in the Mundalla area, although the monthly rainfall-evaporation gradations employed in Fig. 2 are not sufficiently fine to bring out this difference.

The lucerne areas are more independent of immediate climatic influences depending more on subsoil conditions and particularly the presence of sufficient free moisture at a reasonable distance from the soil surface.

It is significant that the two species which have provided the basis for pasture development in South Australia are both legumes and have both depended on liberal dressings of soluble phosphate for their success. The leaves of both species are typically mesophytic and the transpiration rate of each is high. This applies also to *Phalaris tuberosa*, one of the most promising and most drought-resistant of the non-legumes.

It would appear that the use of a suitable strain of one or both of the legumes as a basis, the application of soluble phosphate, the presence of a suitable associate grass such as *Phalaris tuberosa*, Wimmera or perennial rye-grass, and favourable subsoil conditions are necessary for the satisfactory development of pastures with the material now available. Furthermore, apart from areas with underground soakage, there is as yet no definite evidence that these species can be grown successfully and permanently in South Australia below annual rainfall conditions of 17 to 18ins.

10. The Inter-relation of Phosphatic and Nitrogenous Manuring with Competition Effects and Productivity in Pastures.

Extremely little information is available concerning the response of seeded pastures to fertilizer treatment under South Australian conditions The indispensability of superphosphate is generally recognized, but a lack of quantitative data is evident. Nitrogenous fertilizers have been found to increase the grass-clover ratio rather than to increase production materially, and economic responses have not been obtained.

The greatest responses to fertilizer treatment are to be expected on the podsolized soils, which are associated with high winter rainfall and an extended growing season. These soils provide much scope for pasture development in view of their physical suitability for subterranean clover and the comparatively favourable and reliable moisture conditions associated with them. Two relevant problems are concerned with (1) the provision of suitable permanent non-legumes in combination with subterranean clover and (2) the optimum fertilizer dressing for these soils.

To obtain preliminary information regarding these questions, an experiment was carried out in the Meadows district, during 1934, on a podsolized soil representing the *Meadows sand* type (4). The surface horizon consists of a greyish white sand extending to approximately 12ins., with pH = 6.4, P_2O_5 = 0.006 per cent. and loss on ignition 1.47. per cent.* Below this is reddish yellow clay. The mean annual rainfall is 35ins., of which 25ins. falls between April and September. Rainfall exceeds evaporation for 7 months of the year. The rainfall for 1934 was 26ins., distributed as follows:—

Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1.20	0.31	1.03	3.42	1.09	1.25	1.64	4.52	3.72	3.56	3.00	1.34	26.08

The rainfall distribution would appear to be almost ideal for subterranean clover.

The natural vegetation is of the sclerophyll forest type (Fig. 6), with pink gum (*E. fasciculosa*), tea-tree (*Leptospermum myrsinoides*), scrub oak (*Casuarina distyla*) and a little *Banksia* and *Xanthorrhoea*. The dominant native grasses are *Microlaena stipoides, Danthonia setacea, Pentapogon quadrifidus, Neurachne alopecuroides* and *Stipa pubescens*. *Festuca myuros* and *Aira caryophyllea* are the common annuals.

An area of approximately one acre, which had been burnt, was cleared of scrub and ploughed in March 1934. On 17th April, 100 plots, each 20 x 25 links, were laid out in the form of a 10 x 10 Latin square and all were sown with subterranean clover 5lbs. per acre and *Phalaris tuberosa* ½lb. per acre. The 10 treatments employed were nil, 1, 2 and 4cwts. superphosphate per acre at seeding, 2cwts. superphosphate 12 weeks after seeding, basic slag and rock phosphate equivalent to 2cwts. superphosphate at seeding, 2cwts. superphosphate + 56lbs.

* The writer is indebted to Mr. C. S. Piper, M.Sc., and to Mr. R. E. Shapter, A.A.C.I., for the analyses of the "Clear Hills" soil.

sulphate of ammonia, 2cwts. superphosphate + 1cwt. sulphate of potash, and 2cwts. superphosphate + 5cwts. slaked lime, all at seeding.

12 weeks after seeding (10th July) the no manure and rock phosphate plots were particularly poor. Seedlings of both subterranean clover and *Phalaris* were yellowish and retarded in development. Well developed nodules were present on numerous clover roots that were examined.

1cwt. superphosphate produced greatly superior development, with 2cwts. superphosphate again superior. There appeared to be no further development with 4cwts. superphosphate. Basic slag appeared to give a similar response to the equivalent quantity of superphosphate. Neither potash nor lime showed any evident response over and above 2cwts. superphosphate.

The addition of 56lbs. sulphate of ammonia, however, produced a marked response on the part of both clover and *Phalaris*, and the nitrogen-treated plots were outstanding at that stage, being at least three times as vigorous as the

Figure 6.—General view of experimental area at "Clear Hills," Meadows, prior to clearing, 1934.

2cwts. superphosphate plots. The nitrogen-treated plots were the only plots to show a normal healthy development. In all other cases, both clover and *Phalaris* appeared yellowish or retarded in growth.

The effect of the small dressing of nitrogen on the clover is of considerable interest and has been confirmed in pot cultures. In the early stage of clover development, the nodule organisms are actively colonizing, and the nitrogen fixed is probably largely utilized in their own expansion and the development of the clover root system, with the result that comparatively little is available for the growing portions of the leaves. It is probable that the small quantity of additional nitrogen supplied at this stage provides the excess required for the more active development of the top portion.

Establishment counts were made (20 per plot = 200 per treatment) using a 4 sq. link mesh, on the nil, 2cwts. superphosphate and 2cwts. superphosphate + 56lbs. sulphate of ammonia treatments. The results are given in Table III.

TABLE III.—*Showing the seedling establishment of subterranean clover (5lbs. per acre)* + Phalaris tuberosa (*½lb. per acre*) *sown at Meadows (S.A.) with* (a) *no fertiliser,* (b) *2cwts. superphosphate,* (c) *2cwts. superphosphate* + *56lbs. sulphate of ammonia.*

1. *No. of plants per sq. link.*

	Nil.	Super. 2cwts.	Super. 2cwts. + Sulph. Ammon. ½cwt.	Mean.	Standard Error.	
					No.	%
Subterranean clover .	1·83	1·95	2·29	2·02	0·06	3·11
Phalaris tuberosa	0·81	1 01	1·07	0·96	0·06	6·49

2. *Percentage establishment.*

	Nil.	Super. 2cwts.	Super. 2cwts. + Sulph. Ammon. ½cwt.	Mean.
Subterranean clover	57·9	61·7	72·5	63·9
Phalaris tuberosa	46·5	58·0	61·5	55·2

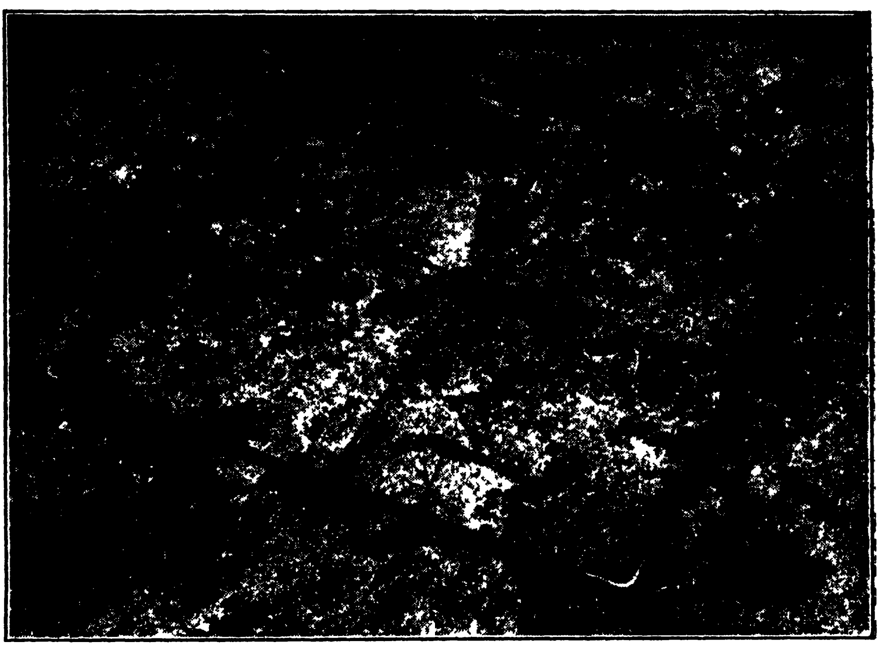


Figure 7.—Close view of plot receiving no fertilizer, at "Clear Hills," Meadows, 12 weeks after seeding, 1934.

The establishment rate is unusually high for both these species and is due probably to the favourable physical soil conditions and the absence of competition. Superphosphate significantly increased the establishment of both species, whereas sulphate of ammonia in addition further increased, significantly and materially, the establishment of subterranean clover. Photographic records of the effect of nitrogen on establishment and early growth are given in Figs. 7-10.

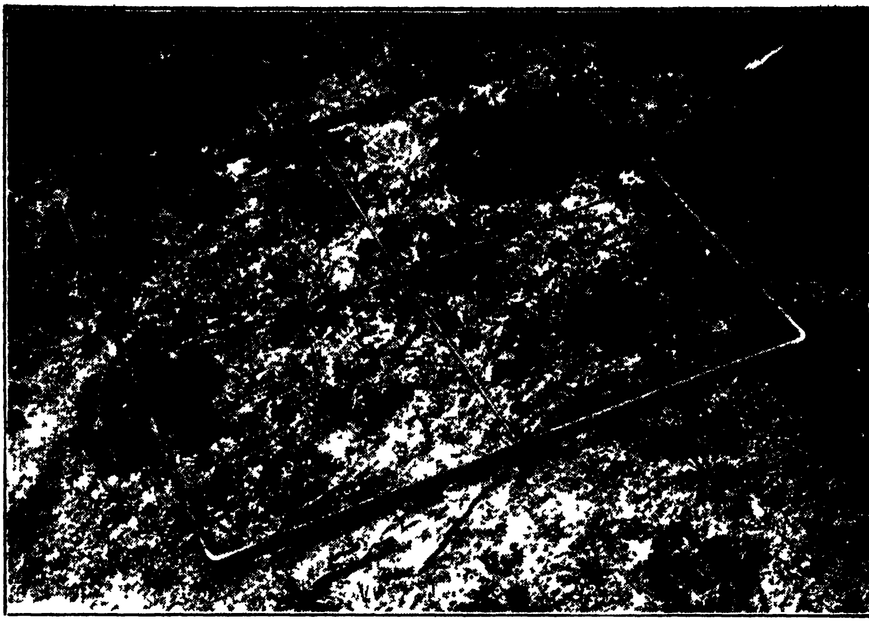


Figure 8.—Close view of plot receiving 2cwts. superphosphate per acre, at "Clear Hills," Meadows, 12 weeks after seeding, 1934.

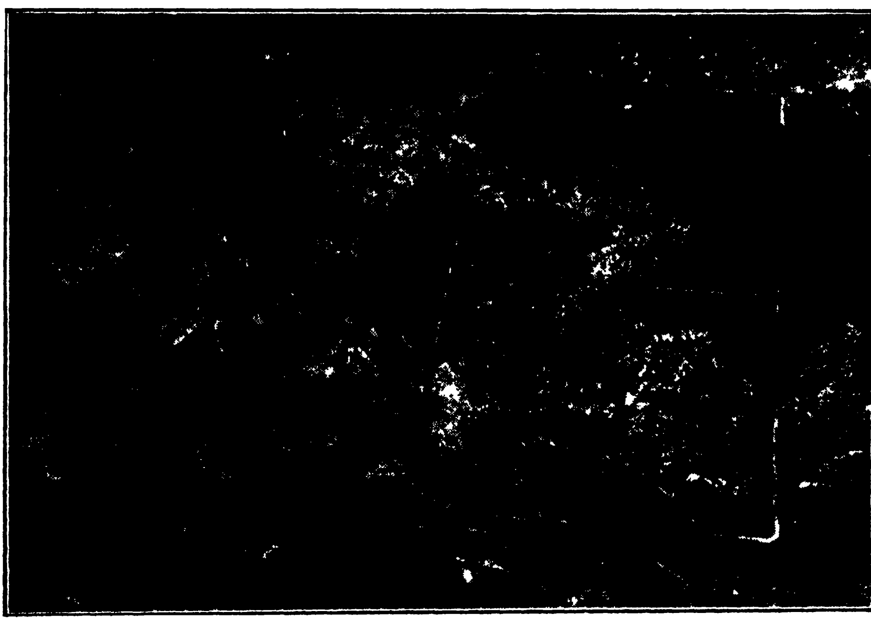


Figure 9.—Close view of plot receiving 2cwts. superphosphate + 56lbs. sulphate of ammonia per acre, at "Clear Hills," Meadows, 12 weeks after seeding, 1934.

Yields were obtained from all plots on 15th November by taking four samples 5 x 2½ links from each plot, or 40 samples per treatment. Each sample was cut to ground level with a sheep-shearing machine, and the four samples for each plot were bulked. The samples were air dried and botanically analyzed *in toto* by the method of percentage estimation by weight. The estimations were preceded and checked, in the case of each laboratory worker, by the hand separation of small samples. The results, based on air-dry weights, are given in Table IV. Photographs of typical plots at harvest are shown in Figs. 11-15.

TABLE IV.—*Showing the yields of air-dry herbage obtained with varying fertiliser treatment on a first year subterranean clover*-Phalaris tuberosa *pasture at Meadows (S.A.)*, 1934. *All yields are in cwt. per acre.*

Treatment.	Nil.	Superphosphate. 1cwt.	Superphosphate. 2cwts.	Superphosphate. 4cwts.	Superphosphate. 2cwts. in Winter	Basic Slag.	Rock Phosphate.	Basal 2cwts. Superphosphate. + S. Am., ½cwt.	Basal 2cwts. Superphosphate. + S. Potash, 1cwt.	Basal 2cwts. Superphosphate. + Lime, 5cwts.	Standard Error (cwt.)
Sub. Clover	4·74	21·79	29·94	36·06	26·80	31·79	7·28	33·35	31·95	29·20	2·07
Phalaris	0·10	1·42	1·85	2·24	1·88	1·07	0·14	3·02	2·72	3·24	0·33
Miscellaneous....	2·28	4·11	5·00	2·61	3·37	2·92	2·99	3·46	3·42	2·96	0·57
Total Yield .	7·11	27·32	36·79	40·91	32·05	35·78	10·41	39·83	38·09	35·40	2·08

S.E. (total yield) = 6·86%.

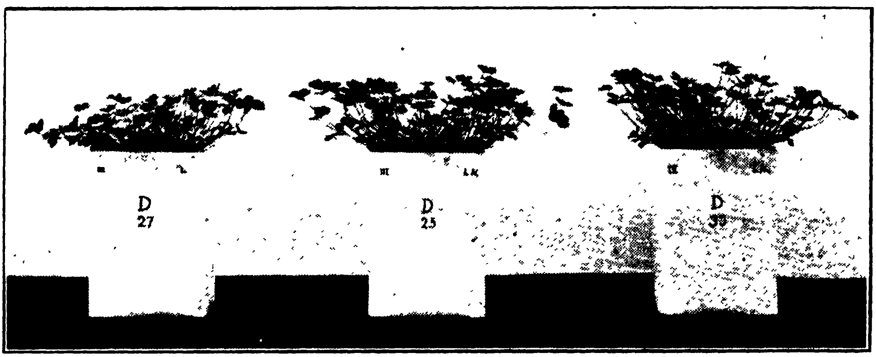


Figure 10.—The effect of soluble nitrogen on the development of Subterranean Clover in pots at the Waite Institute, 12 weeks after seeding. D27—no nitrogen; D25—0.25 gm. $NaNO_3$ per pot; D33—1.0 gm. $NaNO_3$ per pot. All pots received a basal dressing containing abundant nutrients other than nitrogen.

The increase in the yield of subterranean clover due to increasing phosphate dressing is striking, and significant increases were obtained up to 4cwts. superphosphate per acre. The yields of subterranean clover plotted aganst the quantity of superphosphate applied fall almost exactly on the calculated Mitscherlich curve (A = 37.40cwts., K = 0.33). This curve is shown in Fig. 16. From the graph log (A — y) plotted against x, the maximum dressing would appear to be 5.8cwts. superphosphate per acre.

In view of the desirability of rapid establishment from seed and of obtaining both a vigorous development of clover and a satisfactory development of the sown grass in the first season, a dressing of approximately 2cwts. superphosphate per acre with the seed is indicated. Neither lime nor potash produced any material or significant increase on the total yield or the yield of subterranean clover, although both additions significantly increased the development of *Phalaris tuberosa*.

Figure 11.—Close view of plot receiving no fertilizer at "Clear Hills," Meadows, 16th November, 1934.

Figure 12.—Close view of plot receiving 1cwt. superphosphate at "Clear Hills," Meadows, 16th November, 1934.

Figure 13.—Close view of plot receiving 2cwts. superphosphate per acre at "Clear Hills," Meadows, 16th November, 1934.

Figure 14 —Close view of plot receiving 4cwts. superphosphate per acre at "Clear Hills," Meadows, 16th November, 1934.

Basic slag produced yields comparable with the equivalent dressing of superphosphate, but rock phosphate was much inferior and gave little increase over and above the control.

The effect of 56lbs. sulphate of ammonia was not nearly so apparent at the final harvest as at an earlier growth stage, the clover of the superphosphate only plots having made good the leeway to a material degree. Of the ten treatments,

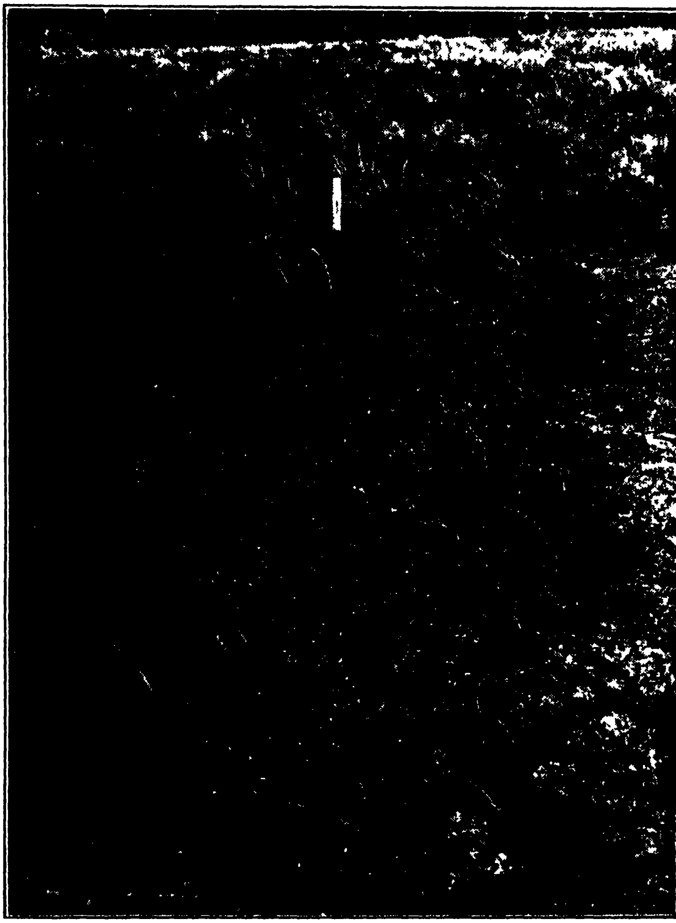


Figure 15.—Mixture of 5lbs. Subterranean Clover + ½lb. *Phalaris tuberosa* per acre; left—receiving 2cwts. superphosphate per acre; right—receiving no fertilizer; "Clear Hills," Meadows, 16th November, 1934.

however, the superphosphate + nitrogen plots were second only to the plots receiving 4cwts. superphosphate. From the Mitscherlich curve it is calculated that the yield of subterranean clover obtained with 2cwts. superphosphate + 56lbs. sulphate of ammonia would have been obtained with 2¾cwts. superphosphate, which is a cheaper dressing by approximately 3s. 6d. per acre. As against that, however, there is an increase of more than 50 per cent. in the development of the associate perennial grass during the first season, which may prove a material advantage.

The competitive effect of the subterranean clover is exemplified in the case of the 4cwts. dressing, as a result of which the miscellaneous annuals present have been depressed and the rate of increase of *Phalaris* has been slightly retarded. *Phalaris* appears better able to withstand competition from subterranean clover than many other plants, owing to its capacity for tallness. The tendency to dominance on the part of the clover appears to be most evident under conditions of maximum phosphate and minimum nitrogen supply.

At the Waite Institute, a basal dressing of 2cwts. superphosphate per acre has been used in all seeded pasture experiments and has proved entirely satisfactory. The application of sulphate of ammonia, however, has not tended to improve the development of seeded pastures, and in this habitat tends to depress clover materially when two dressings of 1cwt. per acre each are applied, one in autumn and one in late winter.

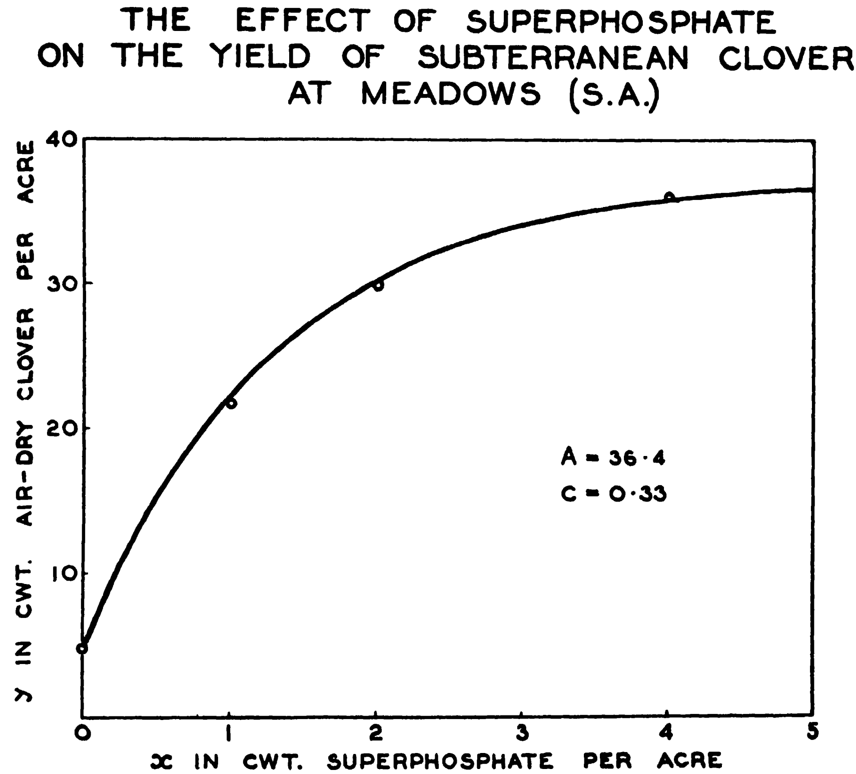


Figure 16.—Curve showing the relationship between the yield of Subterranean Clover and the quantity of superphosphate supplied, "Clear Hills," Meadows, 1934.

During the 1930 autumn, a series of seeded pasture plots was established on a soil typical of the red-brown earth class, on peppermint country at the Waite Institute. This series included pure plots of Wimmera and perennial rye-grass of the Hawke's Bay strain, *Phalaris tuberosa* and a selected mixture of *Danthonia* strains. It also included a pasture mixture of Wimmera rye-grass (5lbs.), perennial rye-grass (10lbs.), *Phalaris tuberosa* (10lbs.) and Dwalganup subterranean clover (5lbs.). Each set of plots received a basal dressing of 2cwts. superphosphate per acre, but was top-dressed with sulphate of ammonia (2cwts. per acre) on every alternate pair of plots, following the ABBA system with eight replications.

Whereas the pure grasses without exception responded to nitrogen, the pasture mixture was depressed by the nitrogen dressing in the fourth and fifth seasons, and over a five years' period nitrogen showed practically no total response.

The total yields under grazing for the three years' period 1931-33 are given in the following table.

TABLE V.—*Showing the response of pure grass swards to the application of 2cwts. sulphate of ammonia per annum over a three year period,* 1931-33.

Grass.	Total Pasture Yield (cwt. per acre).		Increase Due to Nitrogen.	
	No Nitrogen.	Nitrogen.	Cwt. Per Acre.	Per Cent.
Wimmera rye-grass	62·94	125·22	62·28	99
Perennial rye-grass	81·06	115·17	34·11	42
Phalaris tuberosa	99·43	133·97	34·54	35
Danthonia	70·94	90·16	19·22	27

The order of fertility requirement as indicated by the percentage response to nitrogen is in agreement with practical experience with these grasses.

The pasture mixture, after establishment, was subjected to (1) rotational grazing, (2) systematic mowing, (3) annual cutting for hay. The pasture, which was sown on fallow, was dominated by Wimmera rye-grass in the first year.

In the second season, perennial rye-grass assumed almost complete dominance. During the third and fourth seasons, *Phalaris tuberosa* and early subterranean clover increased materially, *Phalaris* becoming dominant on the area cut for hay and clover assuming dominance under systematic mowing. In the fifth year of the experiment, perennial rye-grass disappeared almost entirely, and all three classes were dominated by *Phalaris tuberosa,* with approximately only one plant of the latter to 4 sq. ft. throughout.

The responses to nitrogen over four seasons are given in the following table:—

TABLE VI.—*Showing the response to nitrogen* (*2cwts. sulphate of ammonia per acre per annum*) *of a seeded pasture mixture at the Waite Institute,* 1930-33.

	(Cwt. air-dry herbage per acre).				
	1930.	1931.	1932.	1933.	Mean.
Systematically cut	+3·25	+10·74	−3·24	−5·97	+1·19
Cut and grazed	+3·93	+10·23	+3·86	−3·25	+3·69
Cut as hay	+6·88	+20·62	−1·38	−3·74	+5·59

The botanical composition on the "grazed" and "hay" sections in the fourth seasons was as follows:—

TABLE VII.

	"Grazed" Area.			"Hay" Area.		
	Lolium.	*Phalaris.*	Clover.	*Lolium.*	*Phalaris.*	Clover.
1. Yield in cwt. per acre—						
No Nitrogen	9·45	9·38	6·00	13·65	51·52	0·38
Nitrogen	14·66	5·43	1·07	21·68	39·86	0·27
2. Percentage composition—						
No Nitrogen	37·6	37·3	23·8	20·8	78·6	0·6
Nitrogen	67·0	24·8	4·9	35·1	64·5	0·4

The productivity of the pasture has been maintained at a high level as indicated by the yields on the no nitrogen plots which were as follows:—

	1930.	1931.	1932.	1933.	Mean.
Grazed Area (cwt.)	28·09	32·41	41·80	25·13	31·86
Hay Area (cwt.)	30·44	24·96	63·74	65·55	46·17

The influence of nitrogen, whilst producing no increase in productivity after the second season was responsible for pronounced changes in botanical composition, as indicated in Table VII. In general, the effect of nitrogen was markedly to increase perennial rye-grass which in turn depressed both *Phalaris tuberosa* and subterranean clover. It is considered that this depressing effect is largely due to root competition. Temporary dominance by perennial rye-grass is not desirable in areas liable to severe summer drought, owing to the thinning effect which this species has on species better adapted to withstand (1) the drought period, and/or (2) inevitable temporary declines in available soil nutrients. Much mortality with perennial rye-grass occurs during the winter months, when the rye-grass commonly assumes a yellow unthrifty appearance. *Phalaris tuberosa* established alongside the rye-grass is frequently a deep green colour and vigorous in development under the same conditions. An explanation for this difference may be found in the materially deeper root system of *Phalaris* which may be capable of picking up leached nitrates removed from the rooting zone of the rye-grass.

It appears fairly evident that the only established fertilizer for South Australian conditions as yet is superphosphate at the rate of approximately 2cwts. per acre for the first two or three years. Dressings of sulphate of ammonia of the order of 1 to 2cwts. per acre appear to be out of the question on the experience so far gained but there is scope for the further investigation of lighter dressings such as 56lbs. per acre. There is also scope for the investigation of management in respect to established seeded pastures. The problem of competition in pastures as affected by seeds rates, management, and manuring also merits further investigation.

Above annual rainfall conditions of 17 or 18ins., there appears to be a satisfactory range of plants in the rye-grasses, *Phalaris tuberosa*, subterranean clover and lucerne, with white clover, strawberry clover and cocksfoot for the irrigated areas and the temperate areas of the lower South-East. *Phalaris caerulescens* and *Atriplex semibaccatum* are both possible pasture species for country too arid for *Phalaris tuberosa*. The most desirable addition to this list would be a perennial winter-growing legume of the strawberry clover or white clover type.

So far as improvement within the species is concerned, strain investigation of *Phalaris tuberosa* and perennial rye-grass is being carried out at the Waite Institute. Additional species which would merit further investigation from this point of view, under South Australian conditions, are strawberry clover, in which there is much variation, subterranean clover and *Bromus unioloides* (Prairie Grass). Other species of importance are Kikuyu Grass—as an associate with subterranean clover on bracken country, and on areas which tend to remain moist in summer—and *Paspalum distichum* on swampy land. On the Murray swamps *Paspalum dilatatum* is being used where conditions of soil or management are not suitable for the more desirable rye-grass, cocksfoot mixture.

11. Seeded Pasture Mixtures Adapted to Particular Climatic and Soil Conditions.

As a result of the natural distribution of certain plants such as perennial rye-grass, cocksfoot, white clover and subterranean clover, which have been seeded over much of South Australia in past years, and as a result of many formal and private trials carried out in different parts of the State it is now possible to indicate

with a certain degree of confidence, a number of pasture mixtures as being suitable for specified types of environment. A tentative classification is given in the following table.

TABLE VIII.—*Showing pasture mixtures suitable for specified conditions of moisture supply and general soil type.*

	Conditions of Moisture Supply.		Soil Conditions (General soil type).	Suggested pasture mixtures.
	Total Rainfall (Ins.).	No. of Months R>E.		
1	Irrigation		Drained swamps	(*a*) Perennial rye-grass, cocksfoot, white clover, strawberry clover, red clover.
2	25	7	Volcanic soils and fertile loams	(*b*) *Phalaris tuberosa*, *Poa pratensis*, white clover, strawberry clover.
3	25	6–7	Poorly drained and highly leached soils	Yorkshire fog, white clover, subterranean clover.
4	20	5–6	Black rendzina soils and flats with soakage	(*a*) Perennial rye-grass, strawberry clover. (*b*) *Phalaris tuberosa*, (*Poa pratensis**), strawberry clover.
5	20	5–6	Loams, flats, and improved soils	(*a*) Perennial rye-grass, subterranean clover. (*b*) *Phalaris tuberosa*, subterranean clover. (*c*) Wimmera rye-grass, subterranean clover.
6	20	5–6	Unimproved podsols ...	Subterranean clover (very light seedings of Wimmera rye-grass and *Phalaris tuberosa*).
7	18	4–5	Red-brown earths, grey soils, mallee soils	(*a*) Wimmera rye-grass, early subterranean clover. (*b*) *Phalaris tuberosa*, early subterranean clover. (*c*) Lucerne (Wimmera rye-grass, *Phalaris*).
8	18	5	Light heath country with deep or retentive subsoils	(*a*) Lucerne, *Phalaris*, early subterranean clover. (*b*) Evening primrose.
9	Underground soakage		Friable surface soils with retentive subsoils	Lucerne (*Phalaris tuberosa*).

* Grasses given in brackets for certain conditions have not been fully investigated under the particular conditions noted but appear to be promising.

This brief survey has been very general, and in some respects, far from precise. As one becomes more precise in this type of work, one frequently becomes far less certain of one's ground. Biological work in general is characterized by a lack of that neat precision so readily obtainable in the physical or chemical laboratory; this is certainly true in agriculture, and is particularly true in grassland ecology. The main difficulty in pasture work is the lack of cogent and concrete entities. In the final event, the test of a pasture is in the quantity and value of the animal products obtainable from it per acre, and this can only be measured on a comparatively large scale. Much can be learnt, however, by accurate observation and reasoning, together with extended trials of an exploratory nature, provided these are backed by critical experiments designed to supply accurate data concerning specific problems.

LITERATURE CITED.

1. Davidson, J.: Council for Scientific and Industrial Research, Bul. 79 (1934).
2. Davies, J. G., Scott, A. E., and Fraser, K. M.: *Ibid*, Bul. 83 (1934).
3. Prescott, J. A.: *Ibid*, Bul. 52 (1931).
4. Taylor, J. K. and O'Donnell, J.: Trans. Roy. Soc. South Aust. 56 (1932).
5. Thomas, R. G.: Proc. Roy. Soc. Vic. 34: 117-127 (1922).
6. Trumble, H. C., and Davies, J. G., Council for Scientific and Industrial Research, Bul. 80 (1934).
7. Wood, J. G.: Thesis—"The Vegetation of South Australia," Adelaide University, Library (1934).

ACKNOWLEDGMENTS.

The author desires to thank Mr. Norman Brookman, of "Burbrook," Meadows, for his ready and efficient co-operation in carrying out the "Clear Hills" experiment, near Meadows. To Mr. Basil Proctor, "The Glens," Mount Compass, grateful acknowledgment is also due.

Able assistance has been rendered at various times by Messrs. C. M. Donald, B.Sc.Agr., H. K. Kemp, B.Ag.Sc. (Hons.) and C. A. N. Smith, B.Ag.Sc., and this has been much appreciated.

The photography was in all cases carried out by Mr. A. D. Cocks.

Summary.

1. The nature and productivity of grassland associations are closely dependent on the climatic, edaphic and biotic factors of the immediate environment. It is not unreasonable to expect a close inter-relation between climax vegetation and the types of natural and seeded pastures which develop under essentially the same climatic and soil conditions.

2. The location of the grazing areas of South Australia and the intensity of stocking from point to point have been indicated by the combined dot distributions of sheep, cattle and horses, and these have been superimposed on a map of the major vegetation associations of the State. This delineates the grazing areas within each major type of vegetation and provides a basis for more detailed ecological studies.

3. Agronomic investigations have been confined mainly to the limited areas of forest and savannah; the indigenous grasslands here tend to be dominated by *Danthonia* spp., with *Microlaena-Eragrostis* co-dominant in areas of high and extended rainfall, and *Stipa* spp., co-dominant to dominant as the "mallee" type of environment is approached.

4. *Danthonia* pastures in South Australia appear to have developed chiefly on soils deficient in available phosphate and frequently low in available nitrogen as well. Superphosphate when applied to these pastures improves sheep-carrying capacity and wool production per acre to a material degree, but the utility of the resulting pastures is severely restricted by the generally inferior nature of the annual species which in turn become dominant.

5. The productivity of unfertilized or top-dressed natural pasture at Adelaide is limited primarily by low soil fertility and an inferior botanical nature but is also closely dependent on autumnal rains. It is much less dependent on winter rainfall and is little dependent on spring rains. This is indicated by high significant correlations between the yield of natural pasture and various types of autumnal rainfall, whereas there is little or no correlation between yield and late winter or spring rainfall.

6. Future progress in pasture improvement appears to depend very largely on the efficient use of superior species and strains of exotic herbage plants, even in the areas of dry savannah woodland and of mallee.

7. Legumes seem to be essential as the basis for pasture improvement in South Australia. This is because most soils of the higher rainfall areas tend to be deficient in total nitrogen, whilst even the less common soils of good natural fertility tend to become deficient in available nitrogen in the absence of cultivation or a suitable pasture legume. The legumes of established value for permanent pasture under South Australian conditions are Mount Barker and Dwalganup subterranean clover, lucerne, white clover and strawberry clover. The necessity for permanent associate grasses is now very obvious. The grasses of proven value are Wimmera rye-grass, perennial rye-grass and *Phalaris tuberosa*, with cocksfoot and *Poa pratensis* under irrigation.

8. The area of artificially seeded pasture is as yet small in proportion to the total area of land grazed. Up to the 1932-33 season, 208,418 acres had been sown. Material increases in the area established have occurred since 1923-24, principally since 1928-29.

9. The distribution of seeded pastures in South Australia has been mapped in relation to total rainfall, seasonal rainfall-evaporation ratio and mean air temperature. The dot dispersions for seeded pasture fall into two main groups:—

(*a*) Subterranean clover pastures, located principally south and east of Adelaide on podsolized soils or red brown earths with retentive subsoils.

(*b*) Lucerne, grown principally north of Adelaide. This species is much less dependent on immediate climatic influences than subterranean clover. The physical conditions of the subsoil and the presence of underground reserves of moisture are of paramount importance for lucerne under South Australian conditions.

10. Satisfactory establishment and a high order of productivity have been attained on a podsolized soil at Meadows, using a seeded mixture of 5lbs. subterranean clover + ½lb. *Phalaris tuberosa* per acre. Superphosphate and sulphate of ammonia both significantly improved the establishment of the pasture.

11. The yield of subterranean clover plotted against the quantity of superphosphate applied was found to fall almost exactly on the calculated Mitscherlich curve ($A = 37.40$cwts., $K = 0.33$). The maximum dressing appeared to be 5.8cwts. superphosphate per acre and the most economic dressing in practice approximately 2cwts. per acre. The addition of ½cwt. sulphate of ammonia to the superphosphate dressing increased the yield of clover by a further 3.4cwts. per acre, and *Phalaris* by 1.2cwts. per acre.

12. Pure grass swards at the Waite Institute, on a typical red-brown earth were found to respond very materially to artificial nitrogenous dressings, the order of response being Wimmera rye-grass, perennial rye-grass, *Phalaris tuberosa, Danthonia.* On the other hand, a seeded pasture mixture containing clover, after showing a good response to nitrogen in the second year of establishment, was depressed by nitrogen treatment in succeeding years and over a four-year period the total increases due to nitrogen treatment were negligible.

13. A list of pasture mixtures tentatively suggested for specified environmental conditions is given.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 15.—SLENDER THISTLE.

Carduus tenuiflorus, Curtis.

There are some thirteen species of true thistles in this State, all of which have been introduced, and several of these have been already described in the present series of articles. Regarded as weeds, the character common to all of these plants is the presence of prickles or spines, sometimes confined to the flower-heads, but more usually present also on the stems and foliage. Taken in conjunction with their capacity for rapid multiplication by seed, this character makes the thistles objectionable as a group, rendering them unsuitable as feed for stock, difficult to handle, and liable to cause wounding. Of those naturalised in South Australia, five are on the list of noxious weeds; four—namely, the Star Thistle, the Yellow Cockspur, the Saffron Thistle, and the Canada Thistle—being proclaimed for the entire State, and the remaining one—the Variegated Thistle—for the district of Mount Gambier only. In addition to the importance of certain thistles as individuals, a degree of importance is to be attached to the group as a whole, so that it is desirable to be able to distinguish them, one from another. Certain species, not listed as noxious, are therefore deserving of brief description in this series of "Important Weeds."

The Slender Thistle (*Carduus tenuiflorus*) affords an example of a relatively unimportant member of an important group of weeds. It is an annual or sometimes biennial thistle, easily distinguishable from others by its diffuse, spindly habit, and by having the slender branching stems bordered by spiny wings and terminating in small clusters of flower-heads with pink or purple florets. The individual heads are small and slender as compared with those of other local thistles; they are not more than an inch in length, and much less than this in breadth, their narrow appearance being accentuated by the fact that the surrounding and protective involucral bracts, though numerous and sharp-pointed, do not spread outwards as they do in some other thistles. The whole plant is of a whitish-green colour, due to the presence of a felt-like covering of woolly hairs, most abundant on the under surfaces of the leaves.

Botanical Name and Classification.—Carduus, Latin *Carduus,* a thistle) is an important but rather ill-defined, genus of thistles. Willis gives the species as 35, but remarks that scarcely any floras agree in the species assigned to this and to the nearly related genera *Cnicus* and *Cirsium.* The Variegated Thistle (*Silybum Marianum,* Gaertn.) is included, by some authors, within *Carduus* as *C. Marianus,* L. The detailed structure of the florets present in the head is very similar in both *Carduus* and *Silybum,* but the staminal filaments are free in the former genus and united to form a tube in the latter. The species *tenuiflorus* (literally "slender-flowered") is characterised by having slender, relatively small, clustered flower-heads falling off when mature, by the shape of the surrounding bracts, and by having spiny decurrent wings along the entire length of the stems. *C. tenuiflorus* is synonymised by Ewart ("Flora of Victoria") under *C. pycnocephalus,* Jacq., a very similar species of which the type differs from *C. tenuiflorus* in having fewer and larger flower-heads and stems not winged at the summit. It is possible that the two are not specifically distinct. Some local forms approach *C. pycnocephalus* in having stems which, though spiny, are not conspicuously winged at the top, and a good deal of variation is found as regards the number and size of the flower-heads in a terminal cluster.

Slender Thistle (*Carduus tenuiflorus*, Curtis).
A.—Flower head. B.—Floret. C.—Achene from front. D.—Achene from side.

Botanical Description.—An erect annual or biennial, 1ft. to 4ft. high; stems simple or branched, spiny-winged and leafy up to the summit; leaves sinuate or pinnatifid, white-tomentose especially below, armed with strong spines, the upper ones decurrent and continuous with the winged spiny margins of the stems; heads small, slender, sessile, arranged in clusters, caducous; involucre oblong-cylindrical; bracts numerous, tapering into slender outwardly curved spines, the inner ones equalling or surpassing the purple florets; florets tubular and bisexual; receptacle hairy; achenes oblong, glabrous; pappus of simple bristles. In flower: October-January.

The Slender Thistle occurs along roadsides and waste places, and to a less extent on cultivated ground. It forms large amounts of seed which germinate readily, and dense growths of the weed are sometimes met with, especially in moist situations. Fortunately it does not appear to be aggressive in pasture land, and, not being perennial, does not present a difficult problem of eradication.

REFERENCES.

1. Black, J. M., *Flora of South Australia*, 1922-9.
2. Coste, H., *Flore Descriptive et Illustree de la France*, 11., 1903.
3. Ewart, A. J., *Flora of Victoria*, 1930.
4. Willis, J. C., *A Dictionary of the Flowering Plants and Ferns*, 5th Edit., 1931.

PRUNES FOR OVERSEAS MARKETS.

[*Below is a statement recently made by the Minister of Agriculture (Hon. A. P. Blesing, M.L.C.) with reference to the size and variety of prunes for export overseas.*]

Since the new regulations have been put into force under the Dried Fruits Act, it has been evidenced that the proportion of the South Australian production which weighs more than 100 prunes to the pound is in the proximity of 40 per cent. of the whole production, and prunes of this size cannot be marketed overseas at prices which will return the cost of production to the grower. During the last year or so, large Californian prunes have been sold in London and Glasgow shops at 6d. per pound, and there does not appear to be any immediate prospect of the market rising to any great extent. While such fruit is to be bought, the oversea housewives will not purchase small prunes at any price.

The Minister is appealing to the growers to take such steps as are necessary by pruning and thinning the fruit on trees to raise the South Australian quality, and is soliciting the assistance of the Agricultural Bureau in growing areas to this end.

The South Australian Prune-growers' Association in its report to members states:—

"Your executive is concerned as to the fate of growers of small prunes, as throughout the world the demand is principally for large fruit. Cultural improvements aiming at an increase in the size of South Australian prunes are the most urgent necessity facing the industry to day. Overseas orders for large prunes are now being lost owing to the shortage in the supply of this type, whereas small prunes are only saleable overseas at prices which would hardly pay the charges. On the Australian market the offerings of small prunes have been proved to have a detrimental effect on the total consumption, housewives looking askance at prunes after once having bought small prunes at low prices."

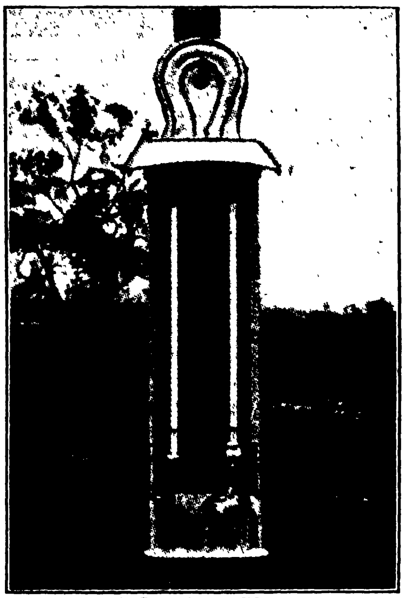
The Minister is advised that the time is fast approaching when it will be in the interest of growers who are producing varieties of prunes which are not in general demand to replace these by varieties which sell more readily. The varieties most easily saleable are:—(1) D'Agen, (2) Robe DeSargent, (3) Splendour. Such varieties as French, German, Fellemberg, and Sugar are increasingly difficult of sale while such large quantities of D'Agen and Robe DeSargent are being placed on the Australian market from New South Wales, and their inferior keeping quality makes a definite risk in shipping overseas.

FROST PREDICTION.

[By A. G. STRICKLAND, M.Agr.Sc., Deputy Chief Horticultural Instructor.]

Inquiries have been received regarding the use of a wet and dry bulb thermometer for the purpose of frost forecasting, and brief notes on procedure are here appended. With the aid of this inexpensive instrument, it is a simple matter for fruitgrowers to advise themselves with reasonable accuracy during the evening of the risk of frost on the following morning.

The instrument comprises two thermometers side by side, the bulb of one being kept constantly moist by means of a wick which dips into a small reservoir of water. The thermometer should be affixed to a convenient post at a height of



Wet and Dry bulb Thermometer.

4ft. to 5ft. from the ground, and shaded, preferably by installation in a shelter of the type described by Mr. J. B. Harris in his bulletin on "Frost Prevention by Orchard Heating."

On calm nights heavy frosts are far more likely when the air is dry, *i.e.*, when the temperature of the wet bulb thermometer is far below the dry bulb temperature, than when the air is moist, or the wet bulb temperature closely approaches the dry bulb temperature.

Translation of differences between the wet and dry bulb temperature readings into terms of frost danger involves some calculation, but by means of a simple chart devised by a Viennese instrument-maker—Kappeler—such calculation may be avoided.

A modification of Kappeler's chart was published by the Victorian Viticulturist, Mr. F. de Castella, in the Victorian *Journal of Agriculture* some years ago. This chart is now reproduced, together with notes from de Castella's article, for the benefit of those growers who wish to utilise the wet and dry bulb thermometer for frost prediction.

Readings are taken on the wet and dry bulb scales about sunset, due recognition being given to the fact that if a strong wind is blowing at the time, the observations will not be reliable; wind will cause excessive evaporation of the surface of the wet bulb which evaporation will have a cooling effect, and result in an abnormally low wet bulb temperature reading. Having obtained reliable readings, the above chart is consulted with the object of determining the locality of the point of intersection of lines proceeding respectively from the observed wet and dry bulb readings. If this point of intersection falls between the two dotted lines running diagonally across the chart, there is danger of frost; if the point

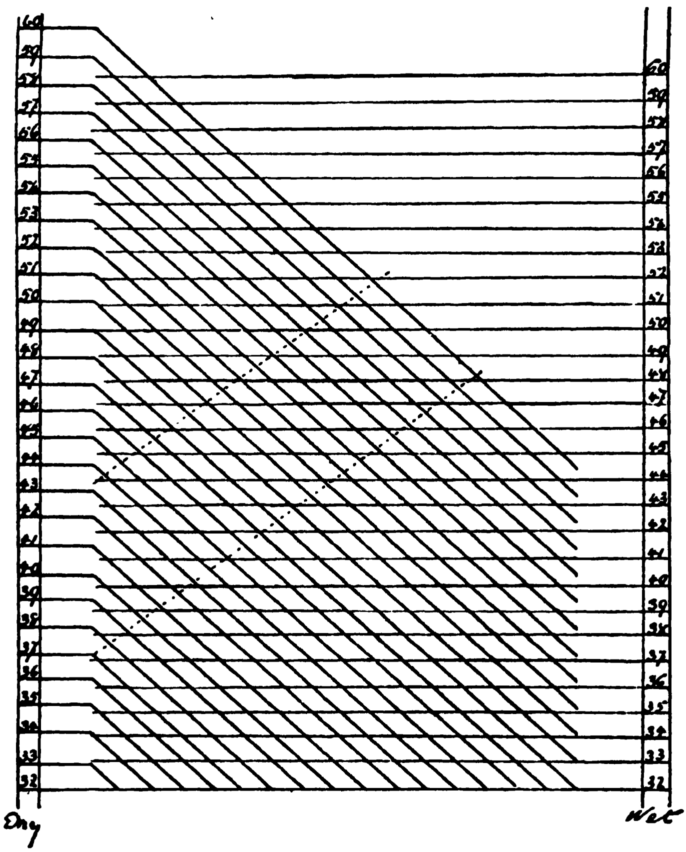


Diagram for prediction of frost.

falls above the uppermost dotted line, there is no danger; and if the point is below the lower dotted line, frost is certain unless cloud or wind develops very rapidly.

Three hypothetical cases are given below in order to illustrate the use of the chart.

Dry Bulb Temperature.	Wet Bulb Temperature.	
52°	49°	Safety.
50°	45°	Danger.
50°	42°	Certain frost.

Irrespective of whether an automatic frost alarm thermometer is installed or not, a wet and dry bulb thermometer used in conjunction with the chart accompanying this note will give very valuable preliminary information to growers.

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during May.	Per Cow during May.	Per Cow July to May.	Per Herd during May.	Per Cow during May.	Per Cow July to May.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H	11	11	6,913	628·45	5,618·65	329·51	29·96	268·78	4·77
7/L	32·87	27·16	13,878½	422·22	5,410·18	623·81	18·98	240·16	4·49
7/P	27·68	23·13	16,931	611·66	6,172·16	815·89	29·48	295·02	4·82
7/Aa	25	10·16	4,606½	184·26	4,832·01	197·04	7·88	220·43	4·28
7/Tt	16·39	15·42	8,907	543·44	7,007·91	384·19	23·44	305·76	4·31
7/Uu	29	8	3,456½	119·19	3,746·14	140·03	4·83	159·86	4·05
7/Xx	21·39	17·81	11,541½	539·57	6,381·52	625·62	29·25	342·38	5·42
7/Bbb	77·90	61·77	33,374½	426·20	5,454·00	1,530·25	19·54	242·48	4·58
7/Ccc	25	22·06	12,528	501·12	5,209·44	494·26	19·75	222·70	3·95
7/Ddd	13	9·87	6,133	471·77	6,109·17	286·36	22·03	292·58	4·67
7/Eee	11	9·35	6,886½	626·04	5,972·74	343·60	31·24	299·70	4·99
7/Ggg	17	11·16	6,659	391·71	3,669·93	317·52	18·68	167·15	4·77
7Hhh	13	9·68	4,300½	330·81	5,944·40	152·25	11·71	208·19	3·54
7/Iii	16	11·32	6,399½	399·96	6,544·30	212·59	13·29	227·84	3·32
7/Jjj	12	7·48	2,981½	248·46	3,854·81	132·83	11·07	180·97	4·45
7/Kkk	29·29	18·74	8,765½	299·26	4,848·62	449·79	15·36	243·76	5·13
7/Lll	17	13·16	8,544	502·59	5,975·21	432·90	25·46	317·20	5·06
7/Mmm	15	14·94	8,629½	575·30	4,929·66	476·07	31·74	257·16	5·52
7/Nnn	11	9	5,058½	459·86	—	193·08	17·55	—	3·82
Means	22·13	16·38	9,289·16	419·70	5,337·81	428·29	19·35	245·18	4·61

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during May.	Per Cow during May.	Per Cow October to May.	Per Herd during May.	Per Cow during May.	Per Cow October to May.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C	29·10	23·29	19,414½	667·16	3,566·60	1,005·93	34·57	185·12	5·18
5/D	33·06	23·03	14,457	437·29	3,378·73	772·95	23·38	182·43	5·35
5/E	34·48	24·29	14,554½	422·11	3,765·65	812·69	23·57	194·11	5·58
5/R	68·55	44·55	27,340	398·82	3,050·71	1,222·68	17·84	136·94	4·47
5/Ee	22	10·23	3,371½	153·25	3,754·92	197·48	8·98	191·95	5·86
5/Z	29·23	24·45	24,547	839·74	5,549·28	1,235·87	42·28	281·74	5·03
5/Ww	20	14·42	11,445½	572·28	3,269·02	516·14	25·81	155·17	4·51
5/Xx	22	11·71	7,558	343·54	3,197·81	376·86	17·13	169·49	4·99
5/Yy	11·48	6·45	5,053	440·15	3,090·91	256·76	22·37	155·98	5·08
5/Aaa	17·94	10·87	6,836	381·05	3,396·17	362·27	20·19	169·47	5·30
5/Bbb	18	5·19	2,034½	113·03	2,677·67	116·63	6·48	134·12	5·73
5/Ddd	28	25·65	22,113½	789·77	6,248·75	918·24	32·79	257·79	4·15
5/Eee	22·06	18·52	12,646	573·25	4,984·59	575·41	26·08	224·35	4·55
5/Fff	9	—			All cows	dry.			
5/Ggg	9·94	8·29	3,159½	317·85	3,641·43	165·52	16·65	170·67	5·24
5/Hhh	19	16·13	8,014	421·79	4,720·26	326·83	17·20	189·45	4·08
					Mar.-May			Mar.-May	
5/Iii	18	13·35	4,490	249·44	1,029·99	277·65	15·43	61·32	6·18
5/Jjj	24·03	21·58	17,364	722·59	1,436·58	895·78	37·28	73·01	5·16
					April-May			April-May	
5/Kkk	14·71	14·71	8,311	564·98	1,026·01	382·12	25·98	46·33	4·60
5/Aa	21	16·74	8,543	406·81	749·50	373·89	17·80	33·12	4·38
Means	23·58	16·67	11,062·63	469·17	3,846·86	539·59	22·88	185·40	4·88

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1935.

Herd No.	Average No. of Cows in Herd.	Average Cows in Milk.	Milk. Per Herd during May.	Milk. Per Cow during May.	Milk. Per Cow March to May.	Butterfat. Per Herd during May.	Butterfat. Per Cow during May.	Butterfat. Per Cow March to May.	Average Test.
9/A ..	30	21·68	8,396	279·87	992·14	422·31	14·08	49·80	5·03
9/C ..	12·84	9·55	4,941½	382·36	1,267·10	202·39	15·63	52·97	4·17
9/D ..	31	27	15,825½	510·50	1,504·83	891·26	28·75	80·80	5·63
9/E ..	12	11·06	5,862½	488·54	1,424·12	295·14	24·60	69·50	5·03
9/F ..	16	10·19	6,966	435·37	995·02	309·81	19·36	46·97	4·45
9/G ..	27·74	24·06	13,415½	483·61	1,424·46	696·90	25·12	73·47	5·19
9/I ..	30	20·03	10,218	340·61	825·87	416·02	13·86	37·48	4·08
9/J...	20·19	13·19	6,762½	334·94	815·55	280·14	13·87	34·36	4·14
9/L ..	30	17·32	10,459	348·63	822·74	386·04	12·87	33·49	3·69
9/O ..	24	17·71	10,246½	426·94	1,183·12	491·79	20·49	54·36	4·80
9/P ..	46·65	28·42	18,571½	398·10	25·50	944·80	20·25	32·37	5·09
9/T ..	19·42	14·03	6,801½	350·23	831·51	305·58	15·74	37·73	4·49
9/W .	26·61	24·74	17,885	672·11	1,556·33	786·87	29·57	65·01	4·40
9/X .	9	7·32	3,593	399·22	1,023·06	180·46	20·05	51·77	5·02
9/Y ..	11	8	4,836	439·63	1,109·74	180·42	16.40	44·40	3·73
9/Z ..	10	8	2,976	297·60	839·73	151·12	15·11	40·86	5·08
9/AA .	16	16	8,339	521·19	1,152·96	473·55	29·60	64·00	5·68
					April-May			April-May	
9/BB .	24	20·10	7,623	317·62	638·24	400·36	16·68	33·15	5·25
9/CC .	19	15·39	12,216½	642·98	915·03	666·76	35·09	48·93	5·42
9/FF .	19·77	0·48	416	21·04	—	14·66	0·74	—	3·52
9/EE .	40·23	27·26	9,112½	226·51	416·14	477·07	11·86	21·36	5·24
9/DD	17	14·55	3,989½	234·68	449·97	199·37	11·73	22·20	5·00
Means	22·38	16·18	8,611·48	384·71	1,000·32	416·95	18·63	48·16	4·84

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR MAY, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during May.	Milk. Per Cow during May.	Milk. Per Cow December to May.	Butterfat. Per Herd during May.	Butterfat. Per Cow during May.	Butterfat. Per Cow December to May.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	17·29	7·87	6,508½	376·43	1,450·76	316·98	18·33	76·60	4·87
6/C ..	17	9·90	7,112½	418·38	2,650·33	330·91	19·47	116·07	4·65
6/Y ..	13	10·23	3,856½	296·65	2,556·39	166·63	12·82	107·85	4·32
6·FF..	28	23·77	10,540	376·43	3,836·03	462·42	16·52	161·61	4·39
6/II ..	20·94	19·87	12,802½	611·39	4,079·27	533·42	25·48	169·79	4·17
6/KK	20	17·71	8,336	416·80	2,848·83	339·99	17·00	109·43	4·18
6/LL .	25	16·97	7,743	309·72	3,069·20	289·65	11·59	114·48	3·76
6/OO .	22·10	18·10	11,768	531·61	3,801·18	571·74	25·83	164·80	4·83
6/SS .	19·29	17·48	13,869½	718·98	4,527·63	534·68	27·72	176·22	3·86
6/TT .	21·52	19·13	11,713	562·39	3,976·71	525·43	25·20	167·09	4·49
6/VV .	27·52	25·19	16,130	586·12	4,190·04	785·34	28·54	194·15	4·87
6/XX	26·90	24·58	16,431½	610·84	4,143·84	679·80	25·27	169·11	4·14
6/CCC	25·23	16·81	7,100½	271·05	2,596·45	335·03	12·82	114·89	4·72
6/DDD	26	20·90	11,640	447·69	3,158·02	504·50	19·40	140·00	4·33
6/JJJ	26	23	16,326½	627·94	3,805·08	805·75	30·99	179·96	4·94
6/NNN	36·52	28·97	17,976	488·43	3,421·18	775·35	21·03	150·80	4·30
6/MMM	7	6·52	5,099	728·43	4,146·66	243·36	34·77	184·93	4·77
6/OOO	20	18	14,430½	721·53	—	578·28	28·91	—	4·01
Means	22·18	18·06	11,076·86	499·32	3,454·57	487·74	21·99	148·20	4·40

AGRICULTURAL BUREAU CONFERENCES.

RIVER MURRAY.

The Annual Conference of River Murray Branches of the Agricultural Bureau was held at Moorook on 20th June. The attendance included members of Branches at Moorook, Renmark, Barmera, Monash, Berri, Ramco, and Waikerie. Mr. F. J. Petch presided and Mr. J. B. Murdoch, representing the Advisory Board of Agriculture, delivered the opening address. The following papers were read:—"The Source of Castor Oil" (Mr. M. J. Herbert, Moorook); "Ailments of Stock" (Mr. F. J. Petch, Moorook); "Why is the Currant Deteriorating?" (Mr. L. A. Chapple, Berri); "Irrigation and Drainage" (Mr. F. R. Arndt, District Horticultural Instructor); "The Economic Value of Australian Birds" (Mr. S. Saunders, Jun., Moorook); and "Green Manuring" (Mr. P. M. Wilksch, Berri). Professor Perkins (Director of Agriculture), Messrs. A. G. Strickland (Chief Horticultural Instructor), N. S. Fotheringham (Manager of Berri Experimental Orchard), and H. C. Pritchard (General Secretary) were also present to reply to questions and to assist in discussions. In the evening Mr. Strickland gave an illustrated address on "Fruit Setting."

It was decided that the next Conference be held under the auspices of the Block E Branch.

EYRE'S PENINSULA (WEST).

The Branches situated in the west districts of Eyre's Peninsula held their Conference at Ceduna on 3rd July, when the Goode Branch was responsible for the arrangements. This was one of the best attended and one of the most successful Conferences which these Branches have held during recent years. While no papers were submitted by members, the agenda was comprised mainly of questions which had a direct bearing on agricultural practices of the district.

The Hon. A. L. McEwin, M.L.C., opened the proceedings and Mr. C. P. Linke presided

In reply to a question asking for an explanation of Goyder's Line of Rainfall, Mr. R. C. Scott (Supervisor of Experimental Work) read a statement which had been prepared by Professor Perkins (Director of Agriculture), who was unavoidably absent. Mr. Scott also dealt with questions relating to the best method of pickling wheat, the milling qualities of wheats in the district as compared with those of the South-East, sheep on fallowed land in mallee districts, mustard seeds found in superphosphate, and the effect of weevils on the germination of seed oats. In the evening, Mr. Scott addressed the meeting on "Suggestions for Improving Returns on Eyre's Peninsula." Mr. H. B. Barlow explained the working of the Dairy Produce Act and Mr. C. A. Goddard gave a demonstration of woolclassing. Messrs. W. H. Brownrigg (District Agricultural Instructor) and H. C. Pritchard (General Secretary) also attended and assisted in the discussions.

The following resolutions were carried:—"That in view of the favourable condition of the State's finances and the unfavourable reports in respect to agricultural operations in these districts, the Government be requested to give relief from motor registration"; "That the Federal Government be asked to remit the tax on petrol"; "That the Federal Government be asked to form a compulsory pool so as to raise wheat to a payable price"; "That we consider there is a very urgent need for reticulating the water on Upper Eyre's Peninsula where farmers are carting water from existing mains"; "That the next Conference be held at Ceduna under the auspices of the O'Loughlin Branch."

GLYCERO-BORIC BLOWFLY DRESSING.

The work of the Council for Scientific and Industrial Research on the blowfly problem has been mainly directed towards the discovery of means of preventing the attack of sheep by blowflies, but the problem of cleaning up blowfly strikes when they occur has also received considerable attention. Numerous dressings commonly used by pastoralists, and also many other substances, have been tested by the Council's Division of Economic Entomology at Canberra, but, until a few months ago, no dressing was found to have all the desirable properties.

To be satisfactory, a blowfly dressing must not only kill the maggots present, but must also help to heal the wound and render it no longer attractive to blowflies. Most dressings commonly used kill the maggots, but many of them also injure the delicate skin of the sheep, and this has been shown to increase the susceptibility of the treated area to blowfly strike. The few dressings commonly used which do not damage the sheep's skin have been found to be unsatisfactory for other reasons.

When investigating the effect of various chemicals on the attractiveness of baits, Mr. M. R. Freney, the biochemist of the Council's team of blowfly research workers, found that baits treated with glycerine or boric acid did not attract blowflies. For various reasons it was thought that a combination of these substances might form a satisfactory blowfly dressing. Dr. I. M. Mackerras, Dr. M. J. Mackerras, and Mr. Freney then carried out over a hundred tests with this dressing under rigorous conditions in the insectaries at Canberra with most promising results.

This new dressing is a colourless, odourless, rather viscous fluid which is easily rubbed into the shorn area of a strike, and adheres readily to the fleece and skin. A few minutes after application the unpleasant normal odour of the strike is changed and becomes much less unpleasant. The maggots are killed rather slowly, 24 to 30 hours often elapsing before all are dead, but they cease to worry the sheep immediately the dressing is applied. Temperature records of struck sheep clearly show the relief afforded, the fever temperature (106° to 108° F.) quickly falling to normal (102° F.) after application of the dressing. The effect of the dressing on the strike wound is decidedly beneficial. The extension of damage to the skin is immediately arrested, and inflamed, but unbroken, skin becomes soft, flexible, and healthy, without any sign of crust. So far it has been found impossible to produce an experimental restrike on a dressed area, even after liberal wetting, but the testing of this point is not yet completed.

In many respects the tests already carried out in insectaries are more rigorous than field tests, but the proof of the value of the dressing must ultimately depend upon the results of extensive tests under normal station conditions. Because of the promising results already obtained, however, the Council has decided to make the new dressing known to pastoralists at this stage, although final proof of its satisfactory large-scale applicability has not yet been obtained.

A relatively simple dressing, which has given quite good results, may be prepared as follows:—Take 1gall. (13lbs.) of glycerine and add 3lbs. of powdered boric acid (commonly known as boracic acid). A thick paste is formed which is then heated and stirred until all the boric acid is dissolved. This results in the formation of various borates of glycerine. After cooling, the clear solution should be kept in well corked bottles or tins, and should be used without dilution.

Better dressings may be made by using more elaborate methods of preparation. For example, preparations containing a higher proportion of boric acid and which have been subjected to temperatures of about 300° F. have given excellent results, but these would be difficult to prepare on a station. If the tests in progress ultimately prove these preparations to be decidedly better than the simple dressing described above, then a means of producing them in bulk at a reasonable price will no doubt be found.

At present prices of the pure chemicals, the cost of the dressing is 11s. per gallon, which works out at about 2d. for each sheep dressed. Tests are being made with crude glycerine, and if it should prove that this can be substituted for the pure product, costs will be about halved.

It is hoped that some pastoralists will try the glycero-boric dressing during the coming season, and that they will let the Council know what kind of results they obtain. Communications should be addressed to the Division of Economic Entomology, P.O. Box 109, Canberra City, F.C.T.

INFECTIOUS ENTERO-TOXAEMIA OF SHEEP.

[At the Ceduna Conference of the Agricultural Bureau, a member of the Petina Branch asked for a résumé of toxaemia poisoning which has been the cause of death of so many sheep in the district. The appended summary was supplied by the Veterinary Branch of the Stock and Brands Department.]

Infectious *entero-toxaemia* is a common disease in this State, affecting grown sheep and lambs running on cultivated paddocks or top dressed pastures. Common names for it are "Stinkwort Poisoning," "Braxy-like Disease," and "Pulpy Kidney of Lambs."

The disease is in the nature of a rapid poisoning set up by the absorption into the animal's system of a powerful toxin (or poison) produced in the bowel by the rapid growth therein of a germ known as the *Bacillus ovitoxicus.*

The disease occurs mainly during the Autumn, Winter, and Spring months. It may appear after the first Autumn rains where the flocks are on cultivated paddocks containing a profuse growth of stinkwort—elsewhere it follows on the establishment of good green feed. Losses from it are usually greatest in the late Autumn and again in the Spring, when lambs more particularly are affected. Good seasons with abundance of green feed are generally bad seasons for infectious *entero-toxaemia.*

Animals of any age from three weeks upwards and of either sex may be affected, and affected animals are almost invariably those in good condition. Sheep in store condition are rarely affected.

Mortalities are usually greatest on farms or in districts where the disease occurs for the first time. In areas where the disease is well-known the death rate is usually lower on the average, excepting amongst sheep that have been newly introduced from areas where the disease in unknown.

Symptoms.—The period of sickness being short (2-4 hours), symptoms are more often than not not observed by the owner, the animals generally being just found dead of a morning near where they camped overnight. Sick animals may be observed when the flock is moved about—they lag behind and develop a staggering gait, with knuckling over of the front limbs. They soon go down, and either just lie quietly until death occurs, or they may struggle violently. Frothing at the mouth and champing of the

jaws are frequently observed, and bloating may become marked prior to death. The losses from infectious *entero-toxaemia* are, as a rule, never great at any one time, but appear more gradually spread over a period of weeks.

Post Mortem.—The carcass is almost invariably that of a well-nourished animal. It is blown up, the skin frequently showing a dark-bluish discolouration. The paunch and small bowel are found to be full of gas and contain less solids than usual, and, on slitting the bowel open, its lining appears redder than usual. A variable quantity of pale-coloured fluid may be found present in the abdominal and chest cavities and in the heart sac. The kidneys are frequently soft and pulpy, especially in lambs (hence the name "Pulpy Kidney").

Predisposing Factors.—The germ of infectious *entero-toxaemia* is a soil inhabitant, and sheep may take it into their digestive tract along with the feed and water. Under normal conditions it occasions them no harm, but if conditions are favourable for its rapid proliferation in the bowel, it becomes pathogenic. Sluggishness of the bowel, induced by lack of exercise, coupled with feeding on abundance of green feed low in fibre content, is very favourable for the production of the disease. Early morning grazing on pasture while it is wet with dew or frost is also dangerous. Injury to the lining of the bowel wall, caused by the pappus hairs of stinkwort, also provides conditions favourable to proliferation of *Bacillus ovitoxicus* in the bowel and the production of the disease.

At times the disease will occur where conditions appertaining to the property are such as are likely to lead to heavy contamination of the soil with the causal organism, viz., cultivation, heavy stocking, and sheep carcasses frequently left lying about to act as incubators for the germ. On such properties grazing sheep, especially if they have to graze "close," may take in through the mouth massive doses of the germ sufficient to set up the disease.

Treatment.—Medicinal treatment is not practicable.

METHODS OF CONTROL.

1. *Vaccination.*—Protective vacination of flocks against infectious *entero-toxaemia* has given very promising results in Western Australia, and this treatment is available for application in this State. Vaccination should be carried out some few weeks before the infectious *entero-toxaemia* season begins. Arrangements have now been made for stockowners to obtain necessary supplies of vaccine direct from the Commonwealth Serum Laboratory, Parkville, Victoria, *providing they first obtain from the Chief Inspector of Stock, Adelaide, a written permit, which must be forwarded with their order to the Laboratory.*

2. *Exercise.*—Compulsory exercise has been found to be beneficial in controlling the disease, and some sheep men claim to be able to prevent it by "dogging" the sheep round the paddock daily.

3. *Feeding of Fibre.*—Curtailing the grazing on green feed to some extent and supplementing this with hand-feeding of chaff is often found beneficial in preventing and checking the progress of the disease. A change on to a rougher type of pasture is also often beneficial.

4. If possible, close grazing should be avoided.

5. Where young lambs mostly are being affected, weaning of them will almost invariably check the progress of the disease immediately. Yarding the ewes and lambs for 24 hours once every four to seven days has given very good results.

6. *Disposal of Carcasses.*—The germ multiplies in carcasses of sheep which have died from this disease, and heavy contamination of the soil results from this source. All carcasses should, therefore, be effectively destroyed as soon as possible to prevent this contamination occurring.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.	
	1	31	
	2	28	
B. Cooke, Kanmantoo.	3	29	88
	4	36	
	5	41	
	6	46	123
			211
	7	—	
	8	—	
	9	—	—
	10	—	
	11	—	
	12	—	—
			—
	13	39	
	14	–	
A. H. Matthews, Bridgewater	15	55	94
	16	48	
	17	42	
	18	27	117
			211
	19	5	
	20	14	
H. F. Muirson, Yundi.	21	7	26
	22	18	
	23	42	
	24	50	110
			136
	25	47	
	26	57	
E. McKee, 5, Rose Street, Carrondown.	27	59	163
	28	65	
	29	61	
	30	55	181
			344
	31	13	
	32	53	
H. C. Stacy, Meadows.	33	56	122
	34	24	
	35	39	
	36	58	121
			243
	37	7	
	38	18	
T. Cleaver, Bridgewater.	39	39	64
	40	40	
	41	16	
	42	30	86
			150
	43	23	
	44	—	
	45	43	66
C. Sandstrom, Yundi.	46	21	
	47	14	
	48	48	83
			149

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.	
	49	29	
	50	52	
A. J. Monkhouse, Woodside.	51	39	120
	52	53	
	53	18	
	54	37	108
			228
	55	31	
	56	51	
J. F. Smith, Meadows.	57	7	89
	58	17	
	59	2	
	60	46	65
			154
	61	53	
	62	33	
A. Young, Bridgewater.	63	39	125
	64	4	
	65	47	
	66	28	79
			204
	67	27	
	68	18	
R. W. McAlister, Yundi.	69	42	87
	70	19	
	71	4	
	72	29	52
			139
	73	49	
	74	55	
T. Duhring, Mallala.	75	29	133
	76	29	
	77	52	
	78	52	133
			266
	79	34	
	80	30	
R. J. Underdown, Meadows.	81	50	114
	82	27	
	83	49	
	84	48	124
			238
	85	24	
	86	41	
S. Hill, Bridgewater.	87	42	107
	88	41	
	89	48	
	90	34	123
			230
	91	—	
	92	12	
W. R. Hedger, Yundi.	93	8	20
	94	34	
	95	1	
	96	19	54
			74

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive to 30th June, 1935.	Totals
Langmaid & Bettison, Salisbury.	97	8	
	98	24	
	99	6	38
	100	38	
	101	2	
	102	—	40
			78
E. Portlock, Meadows.	103	53	
	104	39	
	105	36	128
	106	33	
	107	32	
	108	49	114
			242
Murray Powell, Jupiter Creek.	109	54	
	110	6	
	111	44	104
	112	15	
	113	60	
	114	35	110
			214
G. W. Bignell, Meadows.	115	43	
	116	31	
	117	16	90
	118	25	
	119	38	
	120	38	101
			191
W. M. Field, Yundi.	121	46	
	122	13	
	123	13	72
	124	3	
	125	25	
	126	43	71
			143
C. R. Wharton, Meadows.	127	39	
	128	46	
	129	58	143
	130	47	
	131	40	
	132	45	132
			275
H. H. Hefford, Murray Bridge.	133	32	
	134	48	
	135	38	118
	136	18	
	137	49	
	138	39	106
			224
F. W. Gage, Meadows.	139	27	
	140	1	
	141	dead	28
	142	37	
	143	21	
	144	26	84
			112
W. H. L. Norman, Echunga.	145	52	
	146	29	
	147	—	81
	148	47	
	149	37	
	150	8	92
			173
B. R. Whittington, Yundi.	151	51	
	152	1	
	153	13	65
	154	38	
	155	38	
	156	11	87
			152
B. C. Sanders, Meadows.	157	42	
	158	45	
	159	45	132
	160	41	
	161	4	
	162	12	57
			189
H. H. Gallagher, Pooraka.	163	9	
	164	30	
	165	38	77
	166	5	
	167	12	
	168	35	52
			129
W. Sickert, Meadows.	169	51	
	170	9	
	171	40	100
	172	31	
	173	51	
	174	49	131
			231
W. Restall, Echunga.	175	10	
	176	—	
	177	21	31
	178	35	
	179	31	
	180	44	110
			141
A. G. Dawes, 230, Portrush Road, Glenunga.	181	43	
	182	27	
	183	20	90
	184	—	
	185	41	
	186	50	91
			181
G. W. Sykes, Yundi.	187	29	
	188	6	
	189	12	47
	190	4	
	191	18	
	192	42	64
			111
R. Bartley, Meadows.	193	33	
	194	51	
	195	37	121
	196	30	
	197	32	
	198	40	102
			223
A. & H. Gurr, Mindaroo Poultry Farm, Bradbury.	199	14	
	200	13	
	201	30	57
	202	48	
	203	1	
	204	23	72
			120

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.	
J. J. Devlin, Meadows.	205	48	
	206	41	
	207	54	143
	208	35	
	209	3	
	210	54	92
			235
D. J. Foxwell, Echunga.	211	48	
	212	8	
	213	15	71
	214	14	
	215	38	
	216	3	55
			126
F. J. Buck, Meadows.	217	31	
	218	25	
	219	55	111
	220	30	
	221	35	
	222	23	88
			199
J. A. Grist, Yundi.	223	2	
	224		
	225	10	12
	226	2	
	227	-	
	228	24	26
			38
L. A. King, Meadows.	229	46	
	230	41	
	231	30	117
	232	–	
	233	33	
	234	3	36
			153
R. W. Sando, Echunga.	235	37	
	236	42	
	237	33	112
	238	38	
	239	35	
	240	8	81
			193
B. W. Young, Meadows.	241	45	
	242	40	
	243	33	118
	244	38	
	245	-	38
	246	—	
			156
A. Jarvis, Yundi.	247	24	
	248	6	
	249	17	47
	250	28	
	251	20	
	252	51	99
			146
	253	2	
	254	3	
	255	--	5
	256	2	
	257	3	
	258	2	7
			12

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.	
S. Bridge, Yundi.	259	32	
	260	40	
	261	30	102
	262	23	
	263	39	
	264	10	72
			174
H. G. Egarr, Meadows.	265	49	
	266	44	
	267	22	115
	268	17	
	269	41	
	270	27	85
			200
R. H. Smith, Yundi.	271	46	
	272	13	
	273	21	80
	274	50	
	275	10	
	276	27	87
			167
J. M. Lawson, Meadows.	277	40	
	278	36	
	279	42	118
	280	38	
	281	46	
	282	41	125
			243
J. O. Marshall, Yundi.	283	6	
	284	31	
	285	36	73
	286	48	
	287	37	
	288	18	103
			176
G. Joyce, Meadows.	289	12	
	290	60	
	291	38	110
	292	50	
	293	44	
	294	44	138
			248
J. A. Bradtke, Yongala.	295	6	
	296	—	
	297	31	
		37	
W. H. A. Hodgson, Salisbury.	298	56	
	299	48	
	300	43	
		147	
A. W. McDonald, Gawler.	301	32	
	302	24	
	303	27	
		83	
J. H. Dowling, Glossop.	304	25	
	305	50	
	306	1	
		76	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.		
A. P. Urlwin, Balaklava.	307	33		
	308	30		
	309	8		
		71		
L. S. Ekers, Mount Compass.	310	35		
	311	9		
	312	45		
		89		
V. E. Williams, Semaphore Park.	313	42		
	314	44		
	315	39		
		125		
F. P. Munzberg, Tanunda.	316	41		
	317	39		
	318	39		
		119		
Total Class 1		9,328		

Class 2—Any Other Light Breed.

Competitor.	Bird No.	First Grade Eggs.	
Langmaid & Bettison, Salisbury. (Black Minorcas.)	319	20	
	320	31	
	321	43	
		94	
A. Heaysman, Government Road, Eden Hills. (Cuckoo Leghorns.)	322	36	
	323	54	
	324	29	
		119	
Total Class No. 2.		213	

Class No. 3—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs.	Totals
A. G. Dawes, 230, Portrush Road, Glenunga.	325	29	
	326	14	
	327	64	107
	328	44	
	329	36	
	330	22	102
			209
H. J. Mills, 108, Edward Street, Edwardstown.	331	34	
	332	28	
	333	21	83
	334	11	
	335	39	
	336	dead	50
			133
K. Pennack, Pooraka.	337	47	
	338	37	
	339	9	93
	340	43	
	341	47	
	342	7	97
			190
H. H. Gallagher, Pooraka.	343	34	
	344	5	
	345	34	73
	346	26	
	347	18	
	348	10	53
			127
B. Cooke, Kanmantoo.	349	16	
	350	22	
	351	19	
		57	
H. H. Hefford, Murray Bridge.	352	43	
	353	3	
	354	22	
		68	
J. H. Dowling, Glossop.	355	1	
	356	12	
	357	38	
		51	
L. S. Ekers, Mount Compass.	358	20	
	359	7	
	360	23	
		50	
A. G. Dawes, 230, Portrush Road, Glenunga.	452	1	
	453	7	
	454	17	25
	455	—	
	456	35	
	457	26	61
			86
A. P. Urlwin, Balaklava.	465	18	
	466	29	
	467	25	
		72	
Total Class No. 3		1,043	

Class No. 4.—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs.	Totals
H. J. Mills, 108, Edward Street, Edwardstown. (Rhode Island Reds.)	361	1	
	362	2	
	363	7	10
	364	66	
	365	41	
	366	19	126
			136
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	367	23	
	368	34	
	369	9	66
	370	32	
	371	29	
	372	11	72
			138
F. F. Welford, 1, Ludgate Circus, Colonel Light Gardens. (Rhode Island Reds.)	373	20	
	374	38	
	375	29	87
	376	2	
	377	18	
	378	3	23
			110
V. F. Gameau, Findon Road, Woodville. (Rhode Island Reds.)	379	16	
	380	47	
	381	52	115
	382	35	
	383	12	
	384	32	79
			194

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.		
K. Pennack, Pooraka. (Barnevelders.)	385	21		
	386	23		
	387	16	60	
	388	33		
	389	31		
	390	52	116	
			176	
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	458	2		
	459	9		
	460	37	48	
	461	14		
	462	21		
	463	23	58	
			106	
Total Class No. 4			860	

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

G. R. Cowell, Balhannah.	391	41	
	392	18	
	393	7	66
	394	13	
	395	18	
	396	38	69
			135
A. J. Monkhouse, Woodside.	397	35	
	398	25	
	399	34	94
	400	23	
	401	36	
	402	40	99
			193
G. R. Cowell, Balhannah.	403	35	
	404	24	
	405	20	79
	406	24	
	407	18	
	408	13	55
			134
Total Class No. 5			462

Class No. 7.—Black Orpingtons.

W. R. Christie, Upper Mitcham.	409	27
	410	—
	411	24
		51
Total Class No. 7		51

Class No. 8.—Any Other Heavy Breed.

W. R. Christie, Upper Mitcham. (Rhode Island Reds.)	412	22
	413	26
	414	42
		90
Total Class No. 8		90

SECTION 3.—WET MASH.

Home Project Utility Section.—Any Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.
Peter Western, Ascot Park School. (White Leghorn.)	415	54
Peter Western, Ascot Park School. (White Leghorn.)	416	51
William Sando, Echunga School. (White Leghorn.)	417	30
Douglas Marshall, Yundi School. (White Leghorn.)	418	42
Norman Page, Murray Bridge School. (White Leghorn.)	419	29
Kelvyn & Brian Nicholls, Finniss School. (White Leghorn.)	420	30
Dean Colwell, Grange School (White Leghorn.)	421	21
Warren Hannaford, Paracombe School. (White Leghorn.)	422	44
W. Horne, Woodville School. (White Leghorn.)	423	44
Owen Robinson, Ascot Park School. (White Leghorn.)	424	48
June Chapman, Woodchester School. (White Leghorn.)	425	9
Rosa Hunt, Morphett Vale School. (White Leghorn.)	426	27
Jack O'Sullivan, Morphett Vale School. (White Leghorn.)	427	42
Peter Taylor, Morphett Vale School. (White Leghorn.)	428	3
James Taylor, Morphett Vale School. (White Leghorn.)	429	30
William Gregory, Victor Harbour School. (White Leghorn.)	430	13
Ian Bruce, McLaren Flat School. (White Leghorn.)	431	5
Clifford Burford, Smithfield School. (White Leghorn.)	432	1
Tom Callaghan, Smithfield School. (White Leghorn.)	433	—
Eric Pratt, Abattoirs School. (White Leghorn.)	434	52
Stanley Pratt, Abattoirs School. (White Leghorn.)	435	44
Alan Yelland, Cunliffe School. (Minorca.)	436	23
Gordon Gallasch, Gilles Plains School. (White Leghorn.)	437	31

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 30th June, 1935.
Clarence King, Tarlee School. (White Leghorn.)	438	—
Olive Pitman, Gilles Plains School. (Black Orpington.)	439	60
Donald Heading, Sturt School. (Black Orpington.)	440	43
Clive Steer, Sturt School. (Black Orpington.)	441	23
Herbert Oliver, McLaren Vale School. (Black Orpington.)	442	48
Lyol Stone, Morphett Vale School. (Black Orpington.)	443	51
Ray Candy. Noarlunga School. (Black Orpington.)	444	15
Malcolm Booth, Bridgewater School. (Black Orpington.)	445	50
Murray Hencker and Frank Short, Hamley Bridge School. (Black Orpington.)	446	36
Peter Boucaut, Seaton Park School. (Rhode Island Red.)	447	16
Peter Preece, Gilles Plains School. (Rhode Island Red.)	448	33
Cliff Crosser, Wellington Road School. (White Leghorn.)	449	51
John Keldoulis, Orroroo School. (Black Orpington.)	450	31
Bruce Dooland, Thebarton School. (Black Orpington.)	451	—
Alan Yelland, Cunliffe School. (Rhode Island Red.)	464	2
Total		1,132

FEEDING TESTS AT PARAFIELD POULTRY STATION.

[New Series of Tests by C. F. ANDERSON, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series o tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April to 30th June.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal; 2ozs. wheat per day.
2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.
3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.
4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.
5. Commencing with a crushed barley and crushed wheat mash, greenfeed, meatmeal and then the feeding to be changed according to the season of the year.

	No. Eggs Laid 1st April, 1935, to 31st May, 1935.	No. Eggs Laid Month of June, 1935.	Total Eggs Laid 1st April, 1935, to 30th June, 1935.
No. 1 Test	824	368	1,192
No. 2 Test	831	427	1,258
No. 3 Test	742	414	1,156
No. 4 Test	587	318	905
No. 5 Test	617	307	924

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED 30TH JUNE, 1935.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

Singles—

	Eggs Laid.	Bird No
E. McKee	65	28
E. McKee	61	29
G. Joyce	60	290
M. Powell	60	113

Trios—		
E. McKee	181	28- 30
E. McKee	163	25- 27
W. H. A. Hodgson	147	298-300
Teams—		
E. McKee	344	25- 30
C. R. Wharton	275	127-132
T. Duhring	266	73- 78

Class No. 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	54	323
Langmaid and Bettison (Black Minorca)	43	321

Class No. 3.—Black Orpingtons.

Singles—		
A. G. Dawes	64	327
K. Pennack	47	341
K. Pennack	47	337
Trios—		
A. G. Dawes	107	325-327
A. G. Dawes	102	328-330
K. Pennack	97	340-342
Teams—		
A. G. Dawes	209	325-330
K. Pennack	190	337-342
H. J. Mills	133	331-336

Class 4.—Any other Heavy Breed.

Singles—		
H. J. Mills (Rhode Island Red)	66	364
K. Pennack (Barnevelder)	52	390
V. F. Gameau (Rhode Island Red)	52	381
Trios—		
H. J. Mills (Rhode Island Red)	126	364-366
K. Pennack (Barnevelder)	116	388-390
V. F. Gameau (Rhode Island Red)	115	379-381
Teams—		
V. F. Gameau (Rhode Island Reds)	194	379-384
K. Pennack (Barnevelder)	176	385-390
A. G. Dawes (Rhode Island Reds)	138	367-372

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Singles—		
G. R. Cowell	41	391
A. J. Monkhouse	40	402
Trios—		
A. J. Monkhouse	99	400-402
A. J. Monkhouse	94	397-399
Teams—		
A. J. Monkhouse	193	397-402
G. R. Cowell	135	391-396

Class No. 7.—Black Orpingtons.

Singles—		
W. R. Christie	27	409

Class No. 8.—Any other Heavy Breed.

W. R. Christie	42	414

SECTION 3.—WET MASH.

Singles—		
Olive Pitman, Gilles Plains School (Black Orpington)	60	439
Peter Western, Ascot Park School (White Leghorn)	54	415
Eric Pratt, Abattoirs School (White Leghorn)	52	434
Peter Western, Ascot Park School (White Leghorn)	51	416
Cliff Crosser, Wellington Road (White Leghorn)	51	449
John Keldoulis, Orroroo (Black Orpington)	51	450
Lyol Stone, Morphett Vale (Black Orpington)	51	443

THE STATE EXPERIMENT ORCHARD, COROMANDEL VALLEY, NEAR BLACKWOOD, SOUTH AUSTRALIA.

[By GEO. QUINN, Chief Horticultural Instructor.]

(*Concluded from page* 1391.)

ROOTSTOCKS—FOR PEACH TREES.

As has been the case in all other warm temperate parts of the globe, the peach tree has proved adaptable to a very wide range of the soils and climatic conditions found in this State. In fact, the only absolutely restraining factors to its well-being here would appear to be the excess of winter cold and moisture experienced in limited areas of the extreme south-east, and Mount Lofty Ranges, and the excessive dryness of the hot, low rainfall areas of the interior, where water suitable for irrigation purposes is seldom available.

Brigg's Red May on Almond Stock.

In so far as soils are concerned, it has been found to thrive best where there is a depth of from one to more feet of a well balanced loam containing sufficient sand and organic matter to render it friable and retentive of moisture when subjected to appropriate annual tillage operations. The subsoil should afford an efficient, yet not too rapid, means of drainage relief from any temporary excess of rain or irrigation water.

As previously remarked in this report, the principal subsoils of much of our orchard land consist of deep bands of clay varying in their degrees of resistance to water penetration in different localities, whilst in others the sublayers consist of limestone crusts or calcareous marls, often of

E

Elberta on Almond Stock.

Salwey on Almond Stock.

considerable depths. In the coastal non-irrigated areas, these marls are sometimes more or less blended into the clay substrata. It has only happened when planting certain varieties of peach trees under these latter conditions of soils and subsoils that a limited resort has been made to the use of rootstocks of a different species of prunus—chiefly the almond. At the time these trials were initiated, the growing of peaches on a commercial scale was receiving a good deal of attention in many districts in this State. Plantings were extending into the drier localities north of Adelaide, in the irrigation areas along the valley of the Murray River, as well as creeping up into the wetter and more elevated parts of the Mount Lofty Ranges. In the great majority of these plantations, the rootstocks used consisted of seedling peach trees raised from the stones or "pits" of many varieties. These were usually obtained by the nurseryman in large quantities from the jam making and fruit preserving factories.

Brigg's Red May on Myrobalana Plum Stock

In the drier unirrigated districts where calcareous subsoils were much in evidence, and yellow-fleshed peaches were being grown for canning purposes, the seedling hardshell sweet almond stock was resorted to by some growers. This departure had its warrant in that in parts of Europe and on the Pacific slope in America—chiefly in California—this stock had been used extensively for peach trees. In Europe, rootstocks of the St. Julien, Black Damas, Myrobalan, and common Mussel, and in America, the St. Julien and Damson plums also had been long in use when propagating peach trees for planting in heavy and fairly cold soils.

With these facts before him, the writer, in 1909, when formulating the trials outlined herein, decided to include amongst the rootstocks all of the species or varieties of same which were locally available, of those kinds used in other countries, to see which of them might possibly afford some information relative to their compatibility with certain representative commercial varieties of peaches then in favour in this State.

Elberta on Myrobalana Plum Stock.

Salwey on Myrobalana Plum Stock.

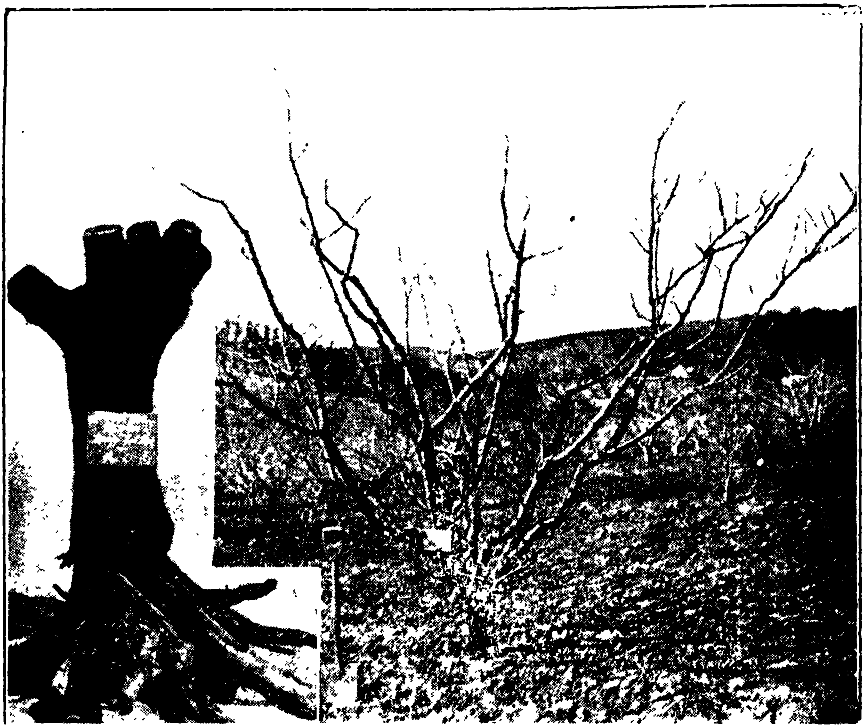
To this end, seedlings were procured from a reliable local fruit tree nurseryman of peach, apricot, almond, Myrobalana plum, and of a chance cross deemed to have taken place between an almond and a peach tree. This latter tree bore foliage midway in appearance between that of a peach and almond, in that its leaves had the colour and texture of the leaf of the former, but the smooth flatness of surface similar to that displayed by the leaves of most varieties of cultivated almonds. The fruits were not so rounded or spherical in shape as those of the cultivated peaches, but possessed a highly coloured epicarp or skin over a thick, almost flavourless mesocarp which, when about to ripen, split open sufficiently to reveal an endocarp or stone, the exterior of which was covered with the deep fret-work of pittings typical of the peach stone. The seedlings of this tree were stout and vigorous in habit. As a limited number only of trees of each of these kinds of stocks were to be used, it was possible to select for budding only those which bore evidences of healthy even development. In addition to the five kinds of rootstocks named above, a combination stock consisting of an almond seedling with an intermediate stem-piece of the hardy, robust growing Salwey variety worked upon it, was used. Upon this in turn the selected varieties of peaches were budded.

These varieties comprised Brigg's Red May, representing the shy bearing earlier ripening types of white fleshed semi-freestone dessert peaches; Elberta, the most widely planted mid-season ripening yellow flesh freestone variety grown for dessert and drying purposes, and at that time, very freely used in local canneries; the Salwey, a late ripening yellowish-green, tough fleshed freestone variety regarded as the most popular canning peach at that period when the clingstone varieties were not favoured by local fruit preserving factories.

The fourth sort, Nicholl's Orange Cling, is a late ripening, large fruited, richly flavoured and highly coloured clingstone variety, representing that type only then being talked of for canning purposes in Australia. This was prior to the introduction of those varieties of clingstone which carry no colour around the stone. The seedling stocks are recorded as having been worked in the nursery at the Blackwood Orchard by the then Manager (Mr. C. G. Savage) in October, 1909, and the trees planted out into the trial plot during August, 1910. (Most of the trees used in the early plantings of stone fruits in this orchard were bench grafted seedlings, using the simple form of splice or whip graft—not whip and tongue —and moulding the raffia-tied union over with clay prior to planting the grafts out into the nursery beds. By adopting this method, a season was saved in preparing the trees.)

The plot of land devoted to these trials is contained in Block D, as shown on the orchard plan. It is located on the upper portion of the slope near to the south-western corner of the orchard area. It immediately adjoins the pear rootstock trial plot on its southern and uphill side. Its greater length extends for 150ft. along the slope from east to west, and its full width is 86½ft. The surface fall to the westward is approximately 33¼in. along the upper side, and 25⅝in. along the lower margin per chain. The fall to the north along the eastern end is 79¼in., and down the western end, 55in. per chain. It will be seen, therefore, that the surface of this portion of the land falls rapidly to the north, thus presenting a very sunny aspect to the trees planted thereon.

The soil in general character, is similar to that described in respect to the adjoining plot carrying the pear rootstock trials. Four test holes were sunk in fairly even order of distribution over the slope. Along the lower— which is the northern half—in the vicinity of the western end where trees



Brigg's Red May on Peach Stock

Elberta on Peach Stock.

Salwey on Peach Stock.

Nicholl's Orange Cling on Peach Stock.

on apricot and peach x almond stocks were planted, about 11in. of a dark-brown coloured, somewhat intractable clay loam rests on 18in. of bluish coloured, gritty marl. Below this is 6in. of a dry, calcareous mixture, which crumbled and readily fell away from the auger. At this depth (35in.), the sublayers became very consolidated without actually reaching the local rock. On the lower eastern portion occupied by almond and plum stocks, only 8½in. of this brown clay loam covered a layer of yellowish marly clay 8½in. thick, but which became slate coloured, crumbling and readily bored about 6½in. deeper. This condition persisted to 2ft. 6in. below the surface, but no solid slate rock was suspected from soundings made with the crowbar several inches deeper.

Brigg's Red May on Apricot Stock.

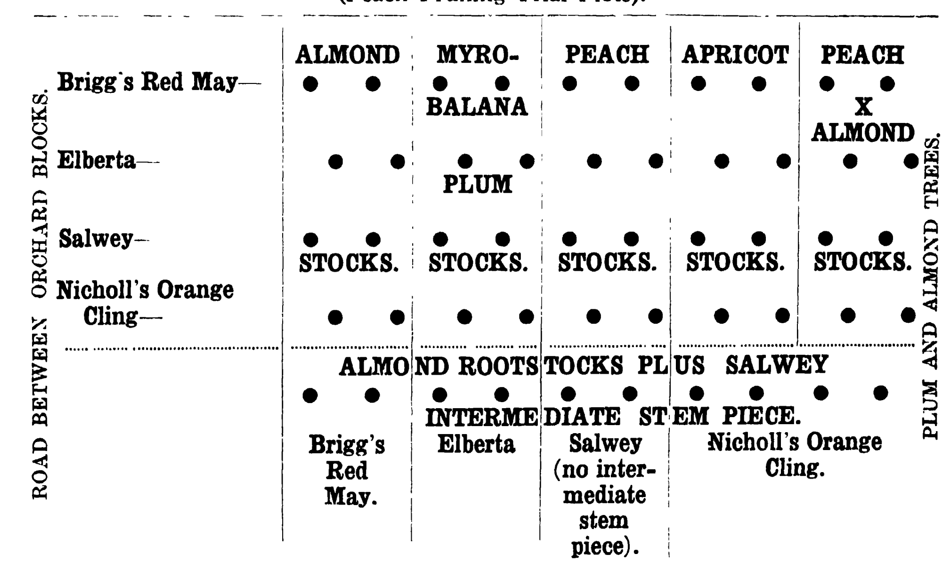
Along the upper and western portion carrying trees on apricot and peach x almond stocks, 9in. of brown clay loam covered a dark red, fairly tough clay layer 14in. thick. At this depth, yellow gritty marly clay followed for 15in., and persisted from 38in. below the surface without any immediate evidence of rock. Towards the lower eastern portion where trees on almond and plum stocks grew, 13in. of the brown loam covered a layer 6in. thick of rather tough red clay. Below this, for 6in., a somewhat dry, stony formation, only breakable with the aid of the crowbar, continued, and at this depth, *viz.*, 25in., the solid, but not very hard native slate rock stratum was located.

This land generally gives one the impression that owing to the effects of many years of clean tillage, combined with the erosive action of the run off of a fairly heavy rainfall, the surface loam has become very impoverished in important elements of fertility, depreciated in texture and reduced in depth.

The large root systems developed from many of the stocks—particularly those from the almond—as indicated by the main root crowns shown in the accompanying illustrations, were found to have spread chiefly between the annual ploughing depth of 5-6in., and the 10in. or 12in. lying immediately below that cultivated layer. In other words, they have not, to any appreciable extent penetrated far below the depth originally disturbed by the subsoiling plough preparatory to planting the trees. In the opinion of the writer, this land in its present condition requires considerable amendment in texture and enrichment in plant foods before it could be deemed to be first class peach growing land.

As the attached sketch plan shows, the peach trees were set out over this area at 20ft. apart on the equilateral triangular or septuple system, forming five longer rows running east to west along the slope. One of each of these four longer rows was devoted to a separate scion variety, whilst the fifth and lowest row carried two trees only of each of these four varieties. Five of the different rootstocks were placed in groups occupying the transverse rows which were formed when the trees were taken in alignment at right angles to the slope of the land. In the sketch plan, these groups are separated by broken lines running in a zig-zag direction across the four long rows. The combination stocks—Salwey stem-piece superimposed upon almond rootstock—occupied the whole of the fifth or lower long row.

SKETCH PLAN OF PLANTING TRIALS CONDUCTED 1910-1930, BLOCK D.
(Peach Pruning Trial Plots).



It will be noted, therefore, that in each of the four long rows, there were two trees of each of the four scion varieties under test on almond, Myrobalana plum, and peach; and one tree of each of these varieties on apricot and peach x almond rootstocks, respectively. In the fifth and lowest of the long rows, there were two trees of each of three of the scion varieties planted, whilst the fourth variety—Salwey—was not double worked. In consequence of this, the crop yields and growth data collected from this variety form simply a replication of the performances of those trees of Salwey on almond rootstock shown in row 3 on the plan in the group occupied by almond rootstocks on the left-hand side of the plot. The single

trees of each of the four scion varieties worked on apricot and peach x almond stocks respectively were included largely for observation purposes —the former stock being locally reputed to be useless, and the latter, as far as the writer's knowledge extended, was quite untried in this climate.

The combination stock, in which Salwey was first worked on to the almond seedling rootstock to form an intermediate stem-piece on which other varieties were to be budded, was adopted because local nurserymen had claimed that this hardy variety displayed a high degree of compatibility with the almond—just as certain varieties of pears are used as intermediates between the quince rootstock and scion varieties of other more desirable kinds of pears which individually lack affinity with that tree. The writer, having had no personal acquaintance with instances where this procedure had been applied to peach tree propagation, readily included it into these trials.

Nicholl's Orange Cling on Apricot Stock.

Influence of Rootstock on Trunk and Branch Development.

It is to be regretted that progressive measurements of growths of trunks and limbs were not collected from each of these trees during the course of the trials. General observations, however, respecting the behaviour of the different varieties on the various rootstocks were frequently made by the writer and the orchard manager during the earlier years following upon the establishment of the plot. It soon became patent to the most casual observer that certain of the rootstocks must inevitably fail in spite of every effort made to establish and protect them.

In 1930—20 years after the date of planting them—so many of the trees had apparently passed their period of useful crop production that it was decided to terminate the trial. With a few noticeable exceptions, these peach trees had gradually declined, and during recent years, large dwindling framework limbs of a number of them had been cut back or wholly eliminated. This is readily detected in several of the accompanying illustrations reproduced from photographs which were taken of the trees

soon after the above decision had been reached. The photographs of the trunks, however, were not taken for several years after they had been grubbed and stored away for demonstrational purposes at the rear of some out-buildings on the orchard premises.

It may be stated here that, contrary to what is deemed desirable with many other kinds of fruit trees, the peach must, to maintain a prolific cropping condition, be kept at a high standard of vegetative activity. Slackened growth not only results in intermittent cropping, but the quality of the fruit also tends to decline rapidly. When grown in loams of average depth overlying stiff clays or marly subsoils, unirrigated peach trees have usually passed the zenith of profitable fruit bearing in this State at about 20 years after being planted. Where the soil is deep, rich, and freely drained, high production may be continued for a longer period, more especially if the trees have been efficiently pruned from the outset, and water is available for irrigation purposes. Peach trees, however, are frequently retained long past this stage, largely, it is believed, because their croppings have not been consistently recorded.

Brigg's Red May on Peach x Almond Stock.

These trees received throughout the course of the trials what has been deemed to be standard tillage and pruning treatments, but no manure of any kind was applied to the land. These cultural treatments have been described in the report on "Rootstocks for Pear Trees." The usual dressings to ensure average immunity from the attacks of parasitic fungus and insect pests were regularly and carefully applied during each year. All of the larger wounds made when pruning, had been immediately

covered with a coating of thick white lead paint. In spite of these precautionary measures, the entry of wood destroying fungi which create the condition commonly known as "Dry Rot" was not wholly prevented. More particularly has this been the result wherever the almond rootstock was used.

The general observations made relative to the behaviour of the different varieties of the peaches when grown on the respective rootstocks may be stated as follows:—

Almond (Hardshell) Rootstock.

It has been claimed by local growers that the Brigg's Red May variety grew successfully on this stock and produced fruit of better colour than when budded on to the seedling peach stock.

The small volume of evidence presented by the trees of this variety grown in these trials has been to the effect that during the first few years after planting they grew well, but at a very early stage began to display signs of the existence of serious incompatibility between the rootstock and the scion variety in the form of the development of masses of extruded tissue around the stem where the junction between stock and scion was located. Notwithstanding this, the limbs continued to extend until the trees reached what may be termed a normal size. About the tenth year—as the crop data also indicates—they had passed the meridian and began to decline towards the sorry condition depicted in the type of tree shown in the photograph of this variety, which, when grubbed was found to have all of its heartwood reduced to a spongy mass permeated throughout by the mycelial growths of the "dry rot" producing fungi.

The Elberta, as indicated by the illustration of a typical tree, developed to normal proportions and as the tables of production show, cropped quite well up to the time of the closing of the trials. When the trees of this variety were grubbed, and the limbs sawn off, the heartwood in some of the main arms was found to be destroyed by "dry rot" fungi and must have collapsed very soon under the strain of a heavy crop of fruit and foliage. This yellow fleshed variety would appear to display a closer affinity with the almond rootstock than did the white fleshed Red May. The above statement, however, requires to be taken with some reservation as the abundant extrusions of calloused tissues around the point where the stock and scion met showed that the union between the scion variety and the root system was being maintained only under increasing difficulty.

The late ripening greenish-yellow fleshed variety, Salwey, as previously stated, was deemed to possess greater compatibility with the almond rootstock than did any of the other varieties. The evidence, in so far as these limited trials can show, appears to lend some support to this contention. Viewed from the basis of tree development and fruit production, the promise is encouraging. The external manifestations of the degree of affinity between rootstock and scion variety take the form of a somewhat increased girth on the part of the stock. The lessened presence of masses of disrupted wood tissues would, it is considered, show the existence of an increased compatibility or capacity to fuse, between the functioning tissues of these two erstwhile separate entities which, in combination, form the complete tree, than has been noted in any of the foregoing varieties. The trees made up of this combination were fairly productive, but had certainly begun to decline at the time the trials terminated.

The behaviour of the yellow fleshed clingstone variety Nicholl's Orange Cling, in respect to the almond stock may be summed up in that the trees grew rapidly into large specimens and produced crops somewhat intermittently—as is the habit of the variety generally in this climate. Their fairly good condition at the end of the trials is evidenced by the last crop being the heaviest they had borne throughout the 14 years they had carried crops. Their stems, however, became very badly calloused around the point of union between stock and scion. When the trees were grubbed, the cores of the sawn off limbs were found to be permeated with "dry rot" fungi, indicating an advanced stage of weakness not revealed in the external appearances of these limbs.

It has been assumed that this apparent dislocation and waste of plant building material which is so abundantly produced in the vicinity of the junction between the scion varieties and the almond rootstocks particularly, arises from some, as yet unexplained, difference between them which it is attempted to cover by the use of the terms "incompatibility" or "lack of

Elberta on Peach x Almond Stock.

affinity." Whether it is the effect of histological, chemotactic, or purely genetic differences, future research may reveal. In a country such as this, where almond and peach trees in particular, are quite frequently affected by the disease known as "crown" or "root gall," one wonders whether this great diversion of the elaborated sapwood in the vicinity of the grafting line on the tree stems may not be aggravated greatly, if not sometimes actually due to the soil inhabiting organism which, it is claimed, causes the "crown" and "root gall" troubles. As this point of union between stock and scion is usually located only a couple of inches above the ground surface on the stem of the ordinary nursery tree, the organism should readily find an entry to the sap vessels before the rough wound often made in removing the top of the budded rootstock has had time to become completely enveloped in the growth of the healing callus of the young tree.

Myrobalana Plum Seedling Rootstocks.

With one solitary exception in these trials, this rootstock proved a failure as a stock for peach trees. In more recent years, it appears to have been similarly classed in both Europe and America. Wickson in "California Fruits and How to Grow Them," Fifth Edition, page 275, after recommending the St. Julien plum as a stock for peaches grown in moister soils says, "The Myrobalan has been used to some extent, but experience generally does not favour any plum stock for the peach, and our largest propagators have abandoned its use."

Hedrick in "The Peaches of New York," issued in 1916, page 148, writes: "The Myrobalan plum, very commonly used for nearly all cultivated plums, was at one time recommended for the peach, but turned out to be very unsatisfactory, and is now practically never used."

The ridiculously small trunk measurements quoted in Table I. and the restricted development of the branch systems, generally of the varieties worked upon it—as seen in the accompanying illustrations—are, with the above exception, representative of its best efforts in the plot devoted to this rootstock.

In some instances, the trees died early, and were replaced by others, but the three diminutive specimens of Salwey, Elberta, and Nicholl's Orange Cling—those of Brigg's Red May having died several seasons previously—represent what remained in 1930 of those planted in 1910.

It is unfortunate that no photograph was taken of the other tree of Salwey variety grown on this stock before the limbs were sawn off, and the butt grubbed. As the photograph of its butt indicates, this tree not only assumed normal proportions in its limb and branch growths, but the union between the plum stock and the scion variety of peach worked upon it, left little to be desired. This line of union had been buried several inches beneath the soil surface, and the writer and the orchard manager both assumed the reason for its superior development would prove to have been due to the scion becoming self rooted.

For this reason, the Manager of the Orchard (Mr. R. Fowler) was asked to have it very carefully removed, and to scrutinise closely the buried portion of the tree when the plot was being cleared. This was done, and the assumption that the Salwey had been growing on its own roots, quite disproved.

When the cropping performances of this tree given in section 6 of Table IV. are carefully noted—its diminutive colleague shown in our illustration helped but very little—the excellence of the affinity which must have existed between the rootstock and the scion variety may be more fully appreciated. At the time of its removal, this tree was in a perfectly sound condition in root and branch, equalling the best preserved of the trees grown on the peach seedling stocks.

When the whole of the trees in this peach stock trial plot were grubbed, the large holes made in removing the boles were left open for many months to permit aeration of the soil to take place. Some of the remaining roots of the almond stocks freely sprouted shoots around the exposed sides of the excavations. The roots of the Myrobalana plum stock on which this Salwey tree had grown so well, did likewise. These plum stools were carefully removed to the nursery during the following winter, and are now being propagated in quantity with a view to being further tested as a rootstock for different commercial varieties of peaches. The facility with which these offsets strike roots in the open nursery beds has been already well demonstrated under the conditions prevailing at Blackwood. Incidentally, it is mentioned that the foliage and young shoots of these rootlings bear a close resemblance to the growths of the plants of Malling Selection No. 9 of the Myrobalana plum stock which is growing close by them in the nursery.

Apricot Seedling Rootstocks.

The trees of Salwey and Brigg's Red May grown on this rootstock were extremely restricted in development—as a full length picture of the latter and illustrations of the trunks of both clearly show. A photograph of the tree of Nicholl's Orange Cling and of the enlarged view of the trunk of same, conveys a correct idea of the comparatively normal development achieved by this variety on apricot rootstock. The smoothness of the line of union between scion and stock is very clearly shown in this latter phase of the picture. Although one or two large limbs had been removed, the absence of "dry rot" in them, as well as in the trunk, should be acceptable as further evidence that the union had been at least a reasonably efficient one in so far as the effective operation of the conducting vessels in both stock and scion were concerned in this particular tree.

Salwey on Peach x Almond Stock.

The tree of Elberta had made fairly good progress on the apricot stock, and its gross yields reached a trifle over 20 per cent. more fruit than that of the Nicholl's Orange Cling on the same rootstock. This, when the comparative cropping habits of the two varieties are taken into consideration, is not an unexpected quantity. Although the trunks and limbs of this tree were sound at the time of its removal from the plot, the large and obliquely placed cornice-like section of embossed tissue which encircled the trunk at the place of junction of stock and scion made one dubious respecting the chances of longevity possessed by such a combination.

Peach x Almond Rootstocks.

Although this was an untried rootstock for the peach tree in this State, it had evidently not escaped the vigilance of the Californian peach growers. Wickson in "Californian Fruits, and How to Grow Them," page 275, Fifth Edition, refers to a "so called peach almond," and from his lucid

description of its fruits, little doubt is left respecting its close relationship with the type of chance hybrid used in these trials under the above designation.

He states it has been little used in California, probably because the straight-out use of peach and almond seedling stocks, which were generally available, had been adopted there with satisfactory results. He dismisses the matter with a brief, but commendatory remark to the effect "that the seedlings when budded to peaches produced good trees."

The evidence of the photographs presented herein of Brigg's Red May, Elberta, and Salwey trees grown in these trials on this stock in the cases of the two first-named varieties at any rate, corroborates Wickson's contention.

Brigg's Red May on Salwey on Almond Stock.

The enlarged views of the trunks of four varieties under test leaves little doubt that this stock forms a better union with the peach scion than is achieved by either the almond or apricot. It would seem as if the infusion of some genetic characters of the peach into this stock has apparently almost removed the cause of the failure of the conducting vessels of the almond rootstock to connect smoothly with those of the peach scion worked upon it.

With the exception of the Salwey variety, the trunks and limbs of the trees worked on this stock were perfectly sound and free from the attacks of "dry rot" fungi at the time of their removal from the land. The tables of figures relative to crop yields indicate that all of the varieties of peach trees grown on this stock, excepting the Nicholl's Orange Cling, bore consistently, though not heavily. The evidence, such as a trial on a very

limited number of trees can offer, would appear not unfavourable to testing this type of rootstock further, especially under climatic and soil conditions which may be somewhat dry for the peach seedling rootstocks.

Salwey on Almond Combination Rootstocks.

The illustrations of the trees, and of the enlargements of the trunks of Brigg's Red May and Elberta, and of that of Nicholl's Orange Cling also, indicate that this combination did not, during the earlier years, tend to restrict strong developments in either roots or tops of the varieties worked thereon.

As the girth measurements of the trunks set out in Table I. show in the cases of Brigg's Red May and Elberta, the short stem piece of Salwey wood was ultimately quite engulfed in huge masses of extruded calloused tissue, presumably from the almond stock. In the case of the Nicholl's Orange Cling, this feature is conspicuously absent, although both the almond rootstock and the Salwey stem piece grafted upon it have a definitely larger girth than the stem of the scion variety—showing to a certain degree that the movements of the sap stream had not been all that could be desired.

When the tops were removed and the large limbs sawn through, it was found that excepting a thin outer shell, those of the Brigg's Red May were consumed by "dry rot" fungi—whilst the limbs of the Elberta were apparently quite sound, and those of Nicholl's Orange Cling only slightly affected by these wood rotting agents.

The crop yield data shows that all three varieties had cropped consistently, but not heavily when worked on this intermediate stem of Salwey inserted between it and the almond rootstock.

Peach Seedling Rootstocks.

Owing to its greater compatibility—arising presumably from its closer genetic position—this rootstock has been accepted the world over as the most suitable one on which to grow all varieties of peaches wherever the environmental conditions of the orchards are not directly inimical to the well-being of the peach tree. As the above conditions, though not ideal, are nevertheless, reasonably favourable to the peach tree at Blackwood, this stock has been viewed as a standard around which the others used in these trials have been grouped for the purposes of comparison.

The illustrations of the trees of the four varieties worked on peach rootstocks, together with the close up views of their respective trunks, leave little doubt that in healthy development they compare more than favourably with any of the trees grown on any of the varieties of other species of prunus or combination of same as used in these trials.

The gradual merging of the rootstock into the basal part of the evenly tapering tree stem indicates that no serious obstruction or lack of compatibility has been displayed when the conducting vessels of the seedling peach stock and scion variety met. The data collected after the trees had been grubbed and the limbs sawn up, showed that in every instance the wood was sound and free from the operations of "dry rot" producing fungi.

The cropping data indicates that whilst only two of the varieties on this rootstock yielded the greatest aggregate weight of peaches per tree at the time of terminating the trials, the average good health of the trees of all four varieties on the peach rootstock held out greater promise of continued high production, than did those of any other stock under test.

Peach Rootstock Trials, Blackwood Experiment Orchard, 1910-30.

TABLE I.—*Showing Girth Developments of Tree Trunks in Twenty Years.*

Variety.	Girth of Rootstock (Inches).	Girth around Union (Inches).	Girth of Tree Stem 6in. above Union (Inches).
	Almond Seedling Rootstock.		
Brigg's Red May	20½	31½	17½
Elberta	34	38	22
Salwey	22	31	18
Nicholl's Orange Cling	47	53	32
	Myrobalana Plum Rootstock.		
Brigg's Red May	—	—	—
Elberta	11	10¼	7¾
Salwey	29¼	29¾	25¼
Nicholl's Orange Cling	6½	12	6½
	Peach Seedling Rootstock.		
Brigg's Red May	28¾	28¼	22¼
Elberta	26	24¼	18¾
Salwey	28½	25¼	21¾
Nicholl's Orange Cling	32	28¼	24
	Apricot Seedling Rootstock.		
Brigg's Red May	9¾	15	7½
Elberta	17¾	23½	15½
Salwey	5¾	6	4½
Nicholl's Orange Cling	24¾	22¾	18½
	Peach x Almond Rootstock.		
Brigg's Red May	24½	22¼	18¼
Elberta	22¾	20½	15
Salwey	25½	22¼	14½
Nicholl's Orange Cling	30¼	30	22¾

Salwey Stem Piece on Almond Rootstock.

	Girth of Rootstock (Inches).	Girth of—		Girth of—	
		1st Union (Inches).	Salwey Stem (Inches).	2nd Union (Inches).	Tree Stem. (Inches)
Brigg's Red May	42	41	41	53	53
Elberta	19½	19½	20½	34	13¼
Salwey	42	52½	—	—	33½
Nicholl's Orange Cling	48	47½	44	35	22

TABLE II.

Variety—Brigg's Red May. Cropping Data, 1914-1929—16 *Years.*

Rootstock—	Almond.			Myrobalana Plum.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1914	2 8	—	2 8	failure	failure	failure
1915	*a*	*a*	*a*	"	"	"
1916	12 6	11 10	24 0	"	"	"
1917	18 13	—	18 13	"	"	"
1918	4 0	—	4 0	"	"	"
1919	2 4	0 5	2 9	"	"	"
1920	10 7	9 15	20 6	"	"	"
1921	*a*	*a*	*a*	"	"	"
1922	—	2 12	2 12	"	"	"
1923	7 12	5 12	13 8	"	"	"
1924	5 0	1 12	6 12	"	"	"
1925	2 0	1 12	3 12	"	"	"
1926	1 8	2 12	4 4	"	"	"
1927	2 0	4 4	6 4	"	"	"
1928		5 4	5 4	"	"	"
1929	—	17 0	17 0	"	"	"
Total yield in 16 years	68 10	63 2	131 12	Nil.	Nil.	Nil.

a Crop failure.

Rootstock—	Peach.			Apricot.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, One Tree.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1914	3 14	—	3 14	failure	failure	failure
1915	*a*	*a*	*a*	"	"	"
1916	11 8	37 13	49 5	"	"	"
1917	9 3	—	9 3	"	"	"
1918	27 0	35 0	62 0	"	"	"
1919	4 1	1 12	5 13	"	"	"
1920	*a*	*a*	*a*	"	"	"
1921	*a*	*a*	*a*	"	"	"
1922	16 0	21 0	37 0	"	"	"
1923	12 0	6 4	18 4	"	"	"
1924	5 8	1 12	7 4	"	"	"
1925	7 0	4 8	11 8	"	"	"
1926	4 0	2 4	6 4	"	"	"
1927	8 4	80 12	89 0	"	"	"
1928	---	2 8	2 8	"	"	"
1929	1 0	99 8	100 8	"	"	"
Total yield in 16 years	109 6	293 1	402 7	Nil.	Nil	Nil.

a Crop failure.

TABLE II.—*Continued.*

Variety—Brigg's Red May, Cropping Data, 1914-1929—16 *Years.—Continued.*

Rootstock—	Peach x Almond.			Salwey on Almond.		
Planted 1910.	1st Grade.	2nd Grade.	Total, One Tree.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1914*	—	—	—	—	—	—
1915*	—	—	—	—	—	—
1916	0 12	—	0 12	16 4	36 9	52 13
1917	2 0	—	2 0	5 13	5 13	11 10
1918	5 0	26 0	31 0	22 0	22 0	44 0
1919	0 11	—	0 11	—	—	—
1920	0 6	1 7	1 13	2 13	1 7	4 4
1921 (*a*)	—	—	—	—	—	—
1922	5 4	7 0	12 4	9 4	2 12	12 0
1923	6 4	4 4	10 8	8 8	5 0	13 8
1924	3 4	8 4	11 8	2 12	4 8	7 4
1925	4 0	2 12	6 12	—	—	—
1926	1 4	—	1 4	1 12	2 0	3 12
1927	2 0	56 0	58 0	7 4	12 4	19 8
1928	1 0	2 0	3 0	3 8	2 8	6 0
1929	—	111 8	111 8	—	171 0	171 0
Total yield in 16 years	31 13	219 3	251 0	79 14	265 13	345 11

* Trees had not reached cropping stage. (*a*) Crop failure.

TABLE III.—*Variety—Elberta. Cropping Data,* 1916-1930—15 *Years.*

Rootstock—	Almond.			Myrobalana Plum.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1916	16 15	4 1	21 0	*	*	*
1917	*a*	*a*	*a*	*	*	*
1918.	14 14	—	14 14	*	*	*
1919.	103 4	7 12	111 0	—	0 4	0 4
1920.	104 4	13 12	118 0	*a*	*a*	*a*
1921.	85 4	9 12	95 0	*a*	*a*	*a*
1922.	87 8	25 8	113 0	*a*	*a*	*a*
1923.	150 0	38 0	188 0	*a*	*a*	*a*
1924.	49 0	19 12	68 12	1 0	0 4	1 4
1925.	121 8	80 0	201 8	—	9 0	9 0
1926.	26 0	2 0	28 0	*a*	*a*	*a*
1927.	76 8	97 8	174 0	1 0	9 0	10 0
1928.	61 0	9 8	70 8	1 8	1 12	3 4
1929.	64 4	105 8	169 12	8 8	3 8	12 0
1930.	145 8	46 0	191 8	—	60 0	60 0
Total yield in 15 years	1,105 13	459 1	1,564 14	12 0	83 12	95 12

a Crop failure. * Trees had not reached cropping stage.

TABLE III.—*Variety—Elberta. Cropping Data,* 1916-1930—15 *Years.—Continued.*

Rootstock—	Peach.			Apricot.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, One Tree.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1916	63 4	4 9	67 13	*	*	*
1917	34 2	2 13	36 15	*	*	*
1918	42 5	—	42 5	*	*	*
1919	214 12	26 0	240 12	6 0	5 8	11 8
1920	108 4	26 0	134 4	5 0	3 4	8 4
1921	94 0	50 0	144 0	3 8	—	3 8
1922	66 8	25 0	91 8	3 8	1 8	5 0
1923	88 0	150 0	238 0	13 0	13 0	26 0
1924	39 8	49 4	88 12	3 4	20 8	23 12
1925	120 0	131 0	251 0	19 0	22 0	41 0
1926	48 0	12 0	60 0	14 0	11 0	25 0
1927	84 8	169 8	254 0	15 8	22 8	38 0
1928	63 8	29 0	92 8	13 0	46 0	59 0
1929	10 12	182 0	192 12	—	36 0	36 0
1930	95 8	67 8	163 0	18 8	17 4	35 12
Total yield in 15 years	1,172 15	924 10	2,097 9	114 4	198 8	312 12

* Trees had not reached cropping stage.

Rootstock—	Peach x Almond.			Salwey on Almond.		
Planted 1910.	1st Grade.	2nd Grade.	Total, One Tree.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1916	—	0 6	0 6	11 7	0 7	11 14
1917	*a*	*a*	*a*	7 9	—	7 9
1918	8 8	—	8 8	6 13	—	6 13
1919	41 0	1 12	42 12	21 0	—	21 0
1920	—	26 8	26 8	35 4	—	35 4
1921	4 8	5 8	10 0	11 4	1 8	12 12
1922	28 8	21 0	49 8	19 4	3 4	22 8
1923	3 0	36 0	39 0	44 0	9 0	53 0
1924	—	35 0	35 0	19 4	0 12	20 0
1925	17 8	11 0	28 8	37 8	—	37 8
1926	10 0	23 0	33 0	17 0	—	17 0
1927	40 8	34 8	75 0	32 0	15 8	47 8
1928	10 0	31 8	41 8	40 8	11 0	51 8
1929	1 0	58 12	59 12	23 12	23 4	47 0
1930	—	102 8	102 8	49 0	20 0	69 0
Total yield in 15 years	164 8	387 6	551 14	375 9	84 11	460 4

a Crop failure.

TABLE IV.—*Variety—Salwey. Cropping Data,* 1915-1930—16 *Years.*

Rootstock—	Almond.			Myrobalana Plum.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1915	*	*	*	5 4	- -	5 4
1916	--	2 13	2 13	6 15	0 7	7 6
1917	52 3	- -	52 3	149 1	—	149 1
1918	2 0	—	2 0	2 8	—	2 8
1919	102 12	16 0	118 12	136 8	67 8	204 0
1920	16 2	10 6	26 8	2 0	0 7	2 7
1921	22 0	15 8	37 8	40 8	8 0	48 8
1922	15 0	18 0	33 0	72 0	27 8	99 8
1923	40 0	32 0	72 0	111 0	180 0	291 0
1924	6 12	—	6 12	74 0	14 0	88 0
1925	62 0	5 0	67 0	182 8	21 0	203 8
1926	10 8	6 0	16 8	57 8	10 8	68 0
1927	25 0	11 4	36 4	138 0	34 8	172 8
1928	27 8	38 8	66 0	277 8	141 4	418 12
1929	7 0	2 12	9 12	5 4	7 4	12 8
1930	28 0	49 8	77 8	70 8	223 0	293 8
Total yield in 16 years	416 13	207 11	624 8	1,331 0	735 6	2,066 6

* Trees had not reached cropping stage.

Rootstock—	Peach.			Apricot.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, One Tree.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1915	8 5	—	8 5	*	*	*
1916	5 10	0 11	6 5	*	*	*
1917	243 6	—	243 6	3 0	—	3 0
1918	7 0	—	7 0	*a*	*a*	*a*
1919	322 0	48 0	370 0	tree	died	—
1920	9 6	3 5	12 11	—	—	—
1921	21 0	5 8	26 8	—	—	—
1922	82 0	29 0	111 0	tree	planted	
1923	108 0	229 0	337 0	*	*	*
1924	40 4	6 8	46 12	*	*	*
1925	209 8	26 0	235 8	*	*	*
1926	13 0	6 8	19 8	*	*	*
1927	43 0	9 8	52 8	6 8	0 12	7 4
1928	138 4	154 4	292 8	*a*	*a*	*a*
1929	3 8	3 0	6 8	*a*	*a*	*a*
1930	2 0	290 0	292 0	—	2 12	2 12
Total yield in 16 years	1,256 3	811 4	2,067 7	9 8	3 8	13 0

* Tree had not reached cropping stage. *a* Crop failure.

TABLE IV.—*Variety—Salwey. Cropping Data,* 1915-1930—16 *Years.—Continued.*

Rootstock—	Peach x Almond.			Salwey on Almond.		
Planted 1910.	1st Grade.	2nd Grade.	Total, One Tree.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1915................	4 15	--	4 15	*	—	--
1916................	12 2		12 2	2 10	1 8	4 2
1917................	86 1	—	86 1	217 8	--	217 8
1918................	9 0	—	9 0	4 0	--	4 0
1919................	96 4	11 0	107 4	246 0	100 4	346 4
1920................	9 14	2 10	12 8	*a*	*a*	*a*
1921................	8 8	7 8	16 0	116 0	15 0	131 0
1922................	8 0	1 0	9 0	218 0	108 8	326 8
1923................	10 0	3 8	13 8	89 0	328 0	417 0
1924................	8 8	1 8	10 0	*a*	*a*	*a*
1925................	25 8	4 8	30 0	98 8	210 8	309 0
1926................	3 8	2 0	5 8	3 8	1 8	5 0
1927................	2 8	0 12	3 4	110 8	38 0	148 8
1928................	11 8	1 12	13 4	132 8	54 8	187 0
1929................	9 4	12 8	21 12	26 0	15 4	41 4
1930................	—	36 8	36 8	77 8	25 0	102 8
Total yield in 16 years	305 8	85 2	390 10	1,341 10	898 0	2,239 10

* Tree had not reached cropping stage. *a* Crop failure.

TABLE V.—*Variety—Nicholl's Orange Cling. Cropping Data,* 1917-1930—14 *Years.*

Rootstock—	Almond.			Myrobalana Plum.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1917................	102 6	—	102 6	*	*	*
1918................	*a*	*a*	*a*	*	*	*
1919................	178 12	5 0	183 12	*	*	*
1920................	14 3	4 6	18 9	*	*	*
1921................	25 12	3 0	28 12	*	*	*
1922................	7 0	—	7 0	*	*	*
1923................	15 0	—	15 0	*	*	*
1924................	5 8	0 8	6 0	*	*	*
1925................	211 0	10 0	221 0	6 0	1 0	7 0
1926................	---	0 8	0 8	*a*	*a*	*a*
1927................	11 0	—	11 0	4 0	—	4 0
1928................	57 0	9 12	66 12	*a*	*a*	*a*
1929................	63 0	14 12	77 12	*a*	*a*	*a*
1930................	137 12	156 0	293 12	*a*	*a*	*a*
Total yield in 14 years	828 5	203 14	1,032 3	10 0	1 0	11 0

* Trees had not reached cropping stage. *a* Crop failure.

TABLE V.—*Variety Nicholl's Orange Cling. Cropping Data,* 1917-1930—14 *Years.—Continued.*

Rootstock—	Peach.			Apricot.		
Planted 1910.	1st Grade.	2nd Grade.	Total, Two Trees.	1st Grade.	2nd Grade.	Total, One Tree.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1917	228 0	—	228 0	10 0	—	10 0
1918 *a*	—	—	—	—	—	—
1919	152 4	9 8	161 12	18 12	—	18 12
1920	6 3	12 1	18 4	0 4	0 14	1 2
1921	52 8	16 8	69 0	9 0	8 0	17 0
1922	12 0	8 8	20 8	9 0	4 8	13 8
1923	60 0	43 0	103 0	20 0	16 0	36 0
1924	27 12	11 0	38 12	7 0	2 4	9 4
1925	81 0	41 8	122 8	33 0	1 8	34 8
1926	3 0	1 8	4 8	3 8	2 0	5 8
1927	45 0	—	45 0	27 0	—	27 0
1928	40 8	46 0	86 8	14 8	20 0	34 8
1929	7 0	7 4	14 4	2 12	1 8	4 4
1930	79 8	30 8	110 0	28 8	8 0	36 8
Total yield in 14 years	794 11	227 5	1,022 0	183 4	64 10	247 14

a Crop failure.

Rootstock—	Peach x Almond.			Salwey on Almond.		
Planted 1910.	1st Grade.	2nd Grade.	Total, One Tree.	1st Grade.	2nd Grade.	Total, Two Trees.
	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
1917	14 3	—	14 3	88 13	—	88 13
1918 *a*	—	—	—	—	—	—
1919	15 12	4 12	20 8	91 12	12 0	103 12
1920	—	5 2	5 2	5 6	1 15	7 5
1921	3 4	2 4	5 8	25 4	5 0	30 4
1922	1 8	4 8	6 0	*a*	*a*	*a*
1923	—	9 0	9 0	92 0	24 8	116 8
1924	Tree	died		17 12	2 0	19 12
1925				79 0	10 0	89 0
1926				*a*	*a*	*a*
1927				42 0	—	42 0
1928				34 8	4 12	39 4
1929				39 0	10 8	49 8
1930				105 12	34 4	140 0
Total yield in 14 years	34 11	25 10	60 5	621 3	104 15	726 2

a Crop failure.

TABLE VI.—*Showing the Total Yields together with Quantities and Percentages of First Grade Peaches Borne by Four Varieties Grown on the Respective Rootstocks.*

Rootstocks— Variety of Peach.	Almond Seedlings. Total Yield.	1st Grade.	Per cent. 1st Grade.	Variety of Peach.	Apricot Seedlings. Total Yield.	1st Grade.	Per cent. 1st Grade.
	Lbs. Ozs.	Lbs. Ozs.	%		Lbs. Ozs.	Lbs. Ozs.	%
Brigg's Red May	131 12	68 10	52·09	Brigg's Red May *a*	—	—	—
Elberta......	1,564 14	1,105 13	70·66	Elberta ...	312 12	114 4	36·53
Salwey	2,864 2	1,758 7	61·39	Salwey	13 0	9 8	73·08
Nicholl's Orange Cling (four trees).	1,032 3	828 5	80·25	Nicholl's Orange Cling	247 14	183 4	73·93
	5,592 15	3,761 3	67·25		573 10	307 0	53·52

a Failure.

Variety of Peach.	Myrobalana Plum Seedlings. Total Yield.	1st Grade.	Per cent. 1st Grade	Variety of Peach.	Peach and Almond Seedlings. Total Yield.	1st Grade.	Per cent. 1st Grade.
	Lbs. Ozs.	Lbs. Ozs.	%		Lbs. Ozs.	Lbs. Ozs.	%
Brigg's Red May *a*	—	—	—	Brigg's Red May	251 0	31 13	12·67
Elberta......	95 12	12 0	12·53	Elberta ...	551 14	164 8	29·81
Salwey	2,066 6	1,331 0	63·93	Salwey	390 10	305 8	78·21
Nicholl's Orange Cling	11 0	10 0	90·91	Nicholl's Orange Cling	60 5	34 11	57·51
	2,173 2	1,353 0	62·26		1,253 13	536 8	42·79

a Failure.

Variety of Peach.	Peach Seedlings. Total Yield.	1st Grade.	Per cent. 1st Grade.	Variety of Peach.	Salwey on Almond (combination). Total Yield.	1st Grade.	Per cent. 1st Grade.
	Lbs. Ozs.	Lbs. Ozs.	%		Lbs. Ozs.	Lbs. Ozs.	%
Brigg's Red May	402 7	109 6	27·18	Briggs' Red May	345 11	79 14	23·11
Elberta......	2,097 9	1,172 15	55·92	Elberta ...	460 4	375 9	81·60
Salwey	2,067 7	1,256 3	60·76	Salwey * ..	—	—	—
Nicholl's Orange Cling	1,022 0	794 11	77·76	Nicholl's Orange Cling	726 2	621 3	85·55
	5,589 7	3,333 3	59·63		1,532 1	1,076 10	70·24

* Included under Almond Seedlings in this table as explained in the text following.

Influence of Rootstock on the Production and Quality of Fruit.

The cropping data set forth in Tables II. to V. showing the annual yields of each of these varieties of peaches when grown on the respective rootstocks have been quoted in detail of first and second grade fruit to enable those interested to note not only their gross production, but the consistency or otherwise of each variety in respect to the quality as well as the quantity borne from year to year.

The fruits classed as first grade were those measuring more than 2$\frac{1}{4}$in. in diameter, free from any serious blemish or disease and conforming in shape and colour with varietal characteristics. The second grade covered all fruits not reaching the above standard and included windfalls.

An analysis of these tables shows that the croppings of three out of the four scion varieties utilised in the trials were very unsatisfactory when they were grown on the Myrobalana plum stocks. The Brigg's Red May

Elberta on Salwey on Almond Stock.

trees proved an absolute failure; the Nicholl's Orange Cling only a trifle better. Those of the Elberta, though slightly more productive than the two foregoing sorts, were still negligible, whilst the yields from one of the trees of Salwey—to which reference has been previously made—were extraordinarily consistent and heavy.

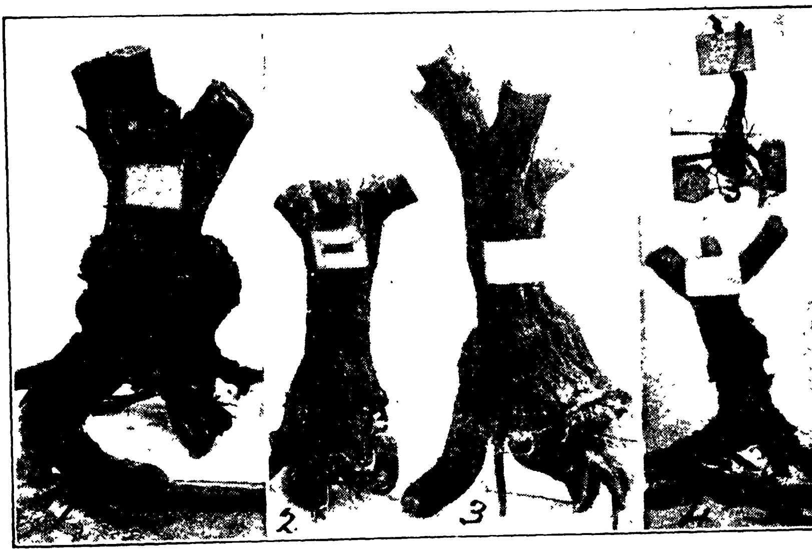
The apricot has also proved a complete failure as a rootstock for Brigg's Red May; almost so for Salwey, and only fairly good for Elberta and Nicholl's Orange Cling in so far as crop yields are concerned.

The crops of Brigg's Red May on almond stocks have not been satisfactory, but from Elberta trees they have approximated within 25 per cent. of those carried by this variety on peach seedling stocks. The gross yield per tree of Salwey when worked on almond stocks was good and approached within 30 per cent. of the average carried by trees of this sort on both peach seedling and Myrobalana plum. The Nicholl's Orange

Cling trees on this stock produced the greatest weight of peaches harvested from any of the four varieties, being 1 per cent. heavier than that borne by the trees on the peach seedling stocks.

The average yield of the Brigg's Red May trees on peach seedling stocks was 20 per cent. less by weight than was recorded from the single tree of this kind grown on peach x almond rootstock, but 14 per cent. more than was carried by the same variety when grafted on the Salwey on almond (combination) stock, and 67 per cent. more than those produced by trees on almond rootstocks.

The Elberta trees on peach stocks yielded the greatest aggregate weight of fruit produced by this variety on any of the rootstocks used in these trials, it being slightly over 25 per cent. more than when this variety was grown on almond stocks, and 47 per cent. greater than was harvested from the single tree of it on peach x almond rootstock.



1. Nicholl's Orange Cling on Almond Stock.
2. Nicholl's Orange Cling on Peach x Almond Stock.
3. Nicholl's Orange Cling on Salwey on Almond Stock.
4. Elberta on Apricot Stock.
5. Salwey on Apricot Stock.

The trees of Salwey worked on peach seedlings are recorded to have individually yielded ½lb. more of peaches in 16-years' crops than did others of this variety worked on Myrobalana plum, a trifle more than 30 per cent. in excess of those grown on almond, and some 62 per cent. more than the trees on the peach x almond rootstocks. Nicholl's Orange Cling trees on peach stocks bore approximately 1 per cent. less peaches by weight than did those of that variety when grown on almond stocks, but carried 29 per cent. more than those of the same sort on the Salwey on almond (combination) and 51 per cent. more than its fellow on apricot stock. The single tree of Brigg's Red May grown on peach x almond produced more fruit than the average per tree of this sort grown on any other rootstock. It was practically 20 per cent. more than was carried by trees of this sort on peach seedling and 31 per cent. heavier than was collected from the trees on the Salwey on almond (combination), which was the only other stock in these trials on which this variety produced any appreciable quantity of peaches. The production of peaches by Elberta trees grown on peach x almond rootstocks was about 47 per cent. less than from the same variety on peach

seedling, and about 30 per cent. less than from those on almond stocks. It exceeded the yields of this variety on the other stocks by approximately 48 per cent. in the case of the Salwey on almond (combination), and 43 per cent. in respect of the trees of it on apricot roots. The gross yield of the Salwey trees on this peach x almond stock was exceeded by those on both peach seedling and Myrobalana plum rootstocks by approximately 79 per cent. in each instance, and by 45 per cent. in the case of the trees on almond stocks.

The Nicholl's Orange Cling tree on this stock bore a few pounds of peaches over about seven seasons from 1917 to 1923, and then declined slowly, and ultimately died.

The Brigg's Red May trees on the Salwey on almond (combination) averaged 31 per cent. less than the tree on the peach x almond, 14 per cent. less than those on peach seedlings, and almost 62 per cent. more than those on the almond stocks.

The Elberta trees on this combination (Salwey on almond) bore approximately 70 per cent. less than on the almond, 78 per cent. below those on peach seedling, 58 per cent. less than the tree on peach x almond, and slightly over 26 per cent. less than that on apricot stocks. Their yields exceeded by 79 per cent. the extremely poor crops gathered from this variety from trees grown on the Myrobalana plum stock.

As the Salwey was not reworked again on its own stem piece in this combination stock (Salwey on almond), its production of fruit cannot be considered as comparative to that of the other three varieties, and has, therefore, been transferred to the test of this variety on almond rootstock.

The trees of Nicholl's Orange Cling on the combination stock yielded nearly 30 per cent. less fruit than when grown on almond, 29 per cent. less than the trees on peach, and 31 per cent. below the trees of the same sort on apricot rootstocks respectively. The crops of this variety on peach x almond and Myrobalana plum stocks were quite negligible in both instances.

In respect to the quality of the fruit produced on the peach trees in these trials, the percentages of first grade peaches borne by each of the different scion varieties grown on the respective rootstocks are presented in Table VI.

The highest percentage of first grade peaches calculated from the aggregate yields of all varieties on any particular rootstock, were harvested from the trees worked on almond rootstocks. There is some evidence in these figures in support of the popular contention that high quality fruits are obtained in an inverse ratio to the heaviness of the yields of the trees. Several of the rootstocks on which all of the varieties consistently show light yields display this feature. The apricot and Salwey on almond combination stocks may be cited in this category.

The consistently high percentages of first grade fruits produced on each of the varieties when grown on the almond stock is more outstanding than is the case of the trees of the same varieties when worked on peach rootstocks. This may be partly accounted for by the fact that there were four trees of each of the reputedly heavy bearing Salwey variety worked on almond stocks. This variety (Salwey) has also, throughout these trials, borne high percentages of first grade peaches from all of the different rootstocks, including even from the Myrobalana plum—which latter instance actually elevated it to a position above the other varieties.

It was—as elsewhere stated—one outstanding tree of Salwey which, by its growth and production of heavy crops of first grade peaches on this stock, has given rise to hopes that it—the particular plum stock—may yet prove of value to peach growers for use when planting peach trees in the heavier and wetter soils of the cooler districts of the State.

The trees in these trials were grown at a planting distance of 20ft. apart on the equilateral triangular system, which allows 125 trees per acre area clear of headlands and roadways. This distance proved to afford quite ample space for the proper development of the trees under the climatic and soil conditions prevailing in the Blackwood Experiment Orchard.

The cropping data quoted in pounds of fruit in Tables II. to V. inclusive set out the total annual yields, and not the quantities actually marketed. These figures were accumulated with unrelaxed care by weighing and grading the fruit from each tree—or from the ground in the case of fallen fruits—throughout the whole cropping period of each variety grown on each respective rootstock.

Taking these figures of the gross yields and transposing them into bushels, each of 45lbs. weight of fruit, the following is an indication of what might be expected to be harvested from an acre of peach trees of similar cropping capacities to the varieties used in these trials during a period of 20 years, dating from the time of planting. This information could, of course, only be directly applicable to districts in which climatic and soil conditions approximate to those prevailing at Coromandel Valley, and it is assumed that the various cultural treatments as described in the preceding report on the Pear Rootstock Trials are annually applied throughout that period of time.

Estimated Annual Yields Per Acre.

Brigg's Red May—Representing the Early Ripening, Shy Bearing Varieties of Dessert Peaches. Averaged Over 16 Years of Cropping.

On Almond Seedling stocks	11½	bushels of which	52·27%	should be First Grade.	
" Myrobalana Plum Seedling stocks	—	bushels of which	—	should be First Grade.	
" Peach " "	35	" "	27·11%	"	"
" Apricot " "	—	" "	—	"	"
" Peach x Almond " "	49¾	" "	12·74%	"	"
" Salwey on Almond " "	34⅓	" "	23·12%	"	"

Elberta—Representing Midseason Ripening Dual Purpose Peaches. Averaged Over 15 Years of Cropping.

On Almond Seedling stocks	145	bushels of which	70·67%	should be First Grade.	
" Myrobalana Plum Seedling stocks	9	bushels of which	12·50%	should be First Grade.	
" Peach " "	194¼	" "	55·91%	"	"
" Apricot " "	58	" "	36·42%	"	"
" Peach x Almond " "	102	" "	29·71%	"	"
" Salwey on Almond " "	42½	" "	81·73%	"	"

Salwey—Representing Late Ripening Freestone, Canning, or Drying Peaches. Averaged Over 16 Years of Cropping.

On Almond Seedling stocks	259	bushels of which	67·24%	should be First Grade.	
" Myrobalana Plum Seedling stocks	179¼	bushels of which	64·42%	should be First Grade.	
" Peach " "	179⅓	" "	60·76%	"	"
" Apricot " "	2⅔	" "	69·23%	"	"
" Peach x Almond " "	68	" "	67·86%	"	"

Nicholl's Orange Cling—Representing Late Ripening Clingstone Canning Peaches. Averaged Over 14 Years of Cropping.

On Almond Seedling stocks	102⅓	bushels of which	80·23%	should be First Grade.	
" Myrobalana Plum Seedling stocks	15	bushels of which	90·90%	should be First Grade.	
" Peach " "	101⅓	" "	77·78%	"	"
" Apricot " "	49	" "	73·38%	"	"
" Peach x Almond " "	11¾	" "	53·33%	"	"
" Salwey on Almond " "	72	" "	85·53%	"	"

TABLE VII.—*Showing the Average Gross Yields per Tree from the different varieties of Peaches Grown on the Respective Rootstocks, also their Gross and Annual Averages on all Stocks.*

Variety.	Number of Crops Recorded.	Rootstocks.						Average from all Stocks. Ten Trees.	Average Annual Yield per Tree, all Stocks. Ten Trees.
		Almond Seedling. Two Trees.	Myrobalana Plum Seedling. Two Trees.	Peach Seedling. Two Trees.	Apricot Seedling. One Tree.	Peach x Almond Seedling. One Tree.	Salwey on Almond Seedling. Two Trees.		
		Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.	Lbs. Ozs.
Brigg's Red May	16	65 14	—	201 3½	—	251 0	172 13½	113 1	7 1
Elberta..................	15	782 7	47 14	1,048 12½	312 12	551 14	230 2	1,508 5	100 9
Salwey (four trees)	16	716 0½	1,033 3	1,033 11½	13 0	195 5	—	740 2½	46 4
Nicholl's Orange Cling.....	14	516 1½	5 0½	511 0	247 14	60 5	363 1	309 15	22 2

In the small Table VII., the production of fruit from these trees of representative types of peaches has been reduced to simple units. The gross production per tree of each variety grown on each of the respective rootstocks is set out, together with the average crop produced per tree over its full period of cropping on all stocks. The final column at the right-hand side shows the average annual production per tree throughout that period. Reduced to this form, some of these figures appear to be almost unbelievably low. It will be observed, however, that from the trees grown on two of the rootstocks, *viz.*, Myrobalana plum and apricot, the returns from most of the varieties have been almost negligible. From three out of four varieties grown on the former stock, the crops have ranged from nil to very light. On the last-named stock, the production of fruits from two varieties may be similarly classed.

It is admitted in plots of this kind, wherein very limited numbers of units of each variety of tree have been used on each kind of rootstock included in the trials, the crop yield data can only be accepted with very great reservations when drawing comparisons between the various stocks undergoing trial. There is, however, data presented here from a series of trials which have extended for a period of 20 years from the planting of the trees and embracing cropping periods ranging from 14 to 16 years as displayed by the respective varieties.

From the data tabulated herein, there does not appear to be any marked difference displayed between any of the rootstocks tested in so far as hastening or delaying the arrival at the cropping stage of any of the varieties grown on them. This statement has reference only to those of the stocks on which the scion varieties grew and developed trees of reasonably normal proportions.

There is one noticeable feature which indicates that in no case where the trees bore—even if only poor crops—did any rootstock alter the comparative cropping habits of the representative varieties grown on them. For instance, Brigg's Red May, which is truly representative of the earliest ripening, but very shy bearing dessert varieties of peaches, has not been induced to set better or more regular crops than are obtained from it, or the members of its class, when grown on peach seedling stocks in commercial orchards or private gardens in this State.

The Elberta variety throughout these trials has, on all stocks, shown up to better advantage in so far as crop yields are concerned, than its fellow heavy bearing type—Salwey—which failed on the apricot, and cropped but very indifferently on the peach x almond stocks.

The Nicholl's Orange Cling had a reputation in this State of being later in reaching the bearing stage, and of proving a somewhat intermittent—if not altogether alternate season—cropper. These characteristics are discernible to a fairly marked degree in the data collected in this trial from trees of it growing on the majority of the root stocks.

If one may venture to arrive at conclusions formed from the observations of tree development and the cropping evidences described herein, it would be to the effect that nothing has been revealed in these small trials which indicates that the seedling peach is likely to be superseded by any of the species or varieties of the genus Prunus included in these trials of rootstocks for peach trees.

Whether the selection of seeds from varieties of peaches known to produce vigorous healthy seedlings will ultimately become practicable of adoption, or whether attempts will be made to segregate and perpetuate by segmentation clonal types of selected seedlings, remains for future experiment and research. Thus far, however, the peach, as distinguished from its close relative, the plum, appears to have proved an indifferent subject whenever submitted to ordinary economic large-scale methods of vegetative propagation.

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIMITED, reported on 1st July, 1935:—

BUTTER.—The frequent showers of rain received throughout June were sufficient to keep the feed going in the dairying districts of the South-East, Hills, and Lower North, but in the Mallee country and Mid-North the conditions are still very backward indeed, and it is disappointing that they have not had good heavy rains in those parts. Cream production in the aggregate, however, through June showed an improvement in quantity and quality, and provided rains are received in the parched areas the tonnage manufactured this season should be satisfactory. Local values continued steady, but the London market improved, so that, under the Equalization Plan, the price for butter fat to the farmers was increased. Present rates are:—Choicest creamery fresh butter in bulk, 1s. 2¾d. per lb.; prints and delivery extra. (This price is for local sale only, and under the quota system the equalised price manufacturers will receive will be 1s. 0½d. per lb., on which basis payments to cream suppliers will be calculated.) Separator lines, from 8d. to 11½d. per lb. for choicest; stores, 6d. to 8d. per lb. (These prices are subject to equalization levies.)

CHEESE.—The turnover in this commodity was well up to the average, both local and Westralian buyers purchasing steadily, and with increased production now showing, exporting has commenced, the first shipment having gone forward by the *Orari* on 27th June. Values are:—Large and medium, from 9½d. per lb.; loaf, from 10d. per lb. at store door, delivery extra; semi-matured and matured, 11d. to 11½d. per lb.

EGGS.—As was expected, a seasonal increase in the quantities of eggs was noted, and with Sydney ceasing to buy, recourse had to be made to packing for export to Britain, and small quantities are being prepared for shipment to relieve the market. Values in consequence came back during the month to nearly export parity, and at present are:—Ordinary country eggs, fair average quality, 9d. per dozen net; long distance rail or shipping eggs lower. Selected new laid clean eggs, full-sized, 11d. to 1s. per dozen net.

BACON.—The turnover in bacon was well maintained throughout the month, and the consumption, owing to the cold wintry weather in June, was quite satisfactory. The lower prices ruling for eggs also assisted in the greater demand for bacon. Ample supplies were marketed by manufacturers each week and rates at present are:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 8d. to 8½d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 2d. to 1s. 4d. per lb.

ALMONDS.—Strong demand continues for almonds in shell, but kernels are temporarily dull of sale, but will no doubt improve shortly. Rates are:—Softshells and Brandis, 8½d. to 9½d. per lb.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 9½d. to 1s. 10½d. per lb.

HONEY.—There was no material alteration in stocks, these being much greater than demand will absorb, and market is sluggish at:—Prime quality clear extracted, 2½d. to 3d. per lb.; lower grades, 1d. to 2d. per lb.

BEESWAX met with ready sale from week to week at quotations, being 1s. 4d. to 1s. 4½d. per lb.

LIVE POULTRY.—Auction sales are held every Tuesday, Wednesday, Thursday, and Friday at our sale rooms, which are in every way the best equipped in South Australia. Good catalogues were submitted at the sales throughout the month, and demand was well sustained. We advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 3s. to 4s.; nice-conditioned cockerels, 2s. 6d. to 2s. 10d.; fair-conditioned cockerels, 1s. 10d. to 2s. 5d.; chickens lower. Heavyweight hens, 2s. 4d. to 3s.; medium hens, 1s. 10d. to 2s. 3d.; light hens, 1s. 5d. to 1s. 8d.; couple of pens of weedy sorts lower. Prime young Muscovy drakes, 3s. to 3s. 10d.; young Muscovy ducks, 2s. to 2s. 7d.; ordinary ducks, 1s. 3d. to 2s.; ducklings lower. Geese, 2s. 6d. to 3s. 6d.; goslings lower. Turkeys, good to prime condition, 8d. to 9½d. per lb., according to quality; turkeys, fair condition, 6d. to 7½d. per lb., according to quality; turkeys, poor and crooked breasted lower. Pigeons, 4½d. to 5d. each.

POTATOES.—New season's, 12s. per cwt.

ONIONS.—Brown Spanish, 8s. 6d. per cwt.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on June 26th, there being present Messrs. A. J. Cooke, A. M. Dawkins, F. Coleman, S. Shepherd, Hon. A. L. McEwin, M.L.C., J. W. Sandford, H. N. Wicks, Professor A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard. Apologies were received from Messrs. R. H. Martin, A. J. A. Koch, and J. B. Murdoch.

LIFE MEMBERS.—Life membership of the Agricultural Bureau was conferred on Messrs. E. Hart (Carey's Gully) and A. B. Ferguson (Arthurton).

NEW BRANCHES.—Conditional approval was granted to the formation of Branches at Karte (Men's and Women's), and Brimpton Lake. Approval was also given for the formation of a Women's Branch at Mudamuckla, with the following ladies as Foundation Members:—Mesdames W. H. and A. C. Watson, G. H. Noske, W. J. Riencke, L. and S. W. Burner, J. Kreusler, P. Flaherty, C. H. Kuhlmann, and S. J. Ettridge, Misses G. Hunter, D. Ettridge, K. Flaherty, E. Hosking, E. and M. Burner, G. Greusler, and M. Dunstall.

BRANCHES TO BE CLOSED.—It was decided to close the Veitch, Big Swamp, Hookina, and Kapinnie Branches.

NEW MEMBERS.—The following names were added to the rolls of existing Branches:— Wirrilla—Rex Kelly, H. Kirk; Mcorook—O. Huddy; Frayville—Edwin Hoffman, J. E. Ramm; Mudamuckla—L. J. Martin; Sheoak Log Women's—Miss Sylvia Dahlenburg; Warramboo Women's—Miss A. A. Sampson; Kybybolite Women's—Mrs. H. S. Naylor, Miss Letty Stevens; Narridy Women's—Mrs. A. Freeman, Miss M. Sandow, Miss A. Threadgold; Sheoak Log Women's—Miss A. Mattiske, Mrs. C. W. H. Dahlenburg; Carey's Gully—H. Hoffman, F. W. Folks, H. J. Folks, A. J. Schulze, H. N. Cook, Lewis Hart, G. M. Hart, A. G. Badenoch, G. H. Halliday, F. Jarrett; Malteo Women's —Miss R. Schwarz; Laura Bay—J. Osman; Chapman's Bore—A. Hill (Foundation Member).

SKELETON WEED.—Mr. Dawkins drew attention to the damage that was being done to wheat lands in New South Wales by Skeleton Weed, and suggested that steps should be taken to guard against its introduction into this State. Dr. Richardson reported that the C.S. & I.R., in conjunction with the New South Wales Department of Agriculture, were making investigations at Wagga concerning the control of this weed. It was decided that Mr. Clarke, Botanist at the Roseworthy Agricultural College, should be asked to contribute an illustrated article dealing with Skeleton Weed for publication in the *Journal.*

Other items were considered in Committee.

PAPERS READ AT CONFERENCES.

DAIRY CONFERENCE, MOUNT BARKER, 9th MAY, 1935.

SOME DAIRY HOME-TRUTHS.

[J. Y. HURD, Adelaide.]

The heavy increase in butter production which has been brought about in recent years by certain economic factors, coupled with the closing of many of our former markets by the forces of economic nationalism which is so evident in many of the nations to-day, threatens to bring about a condition of chaos in the Dairying Industry, especially in our own State with its preponderance of second-grade butter.

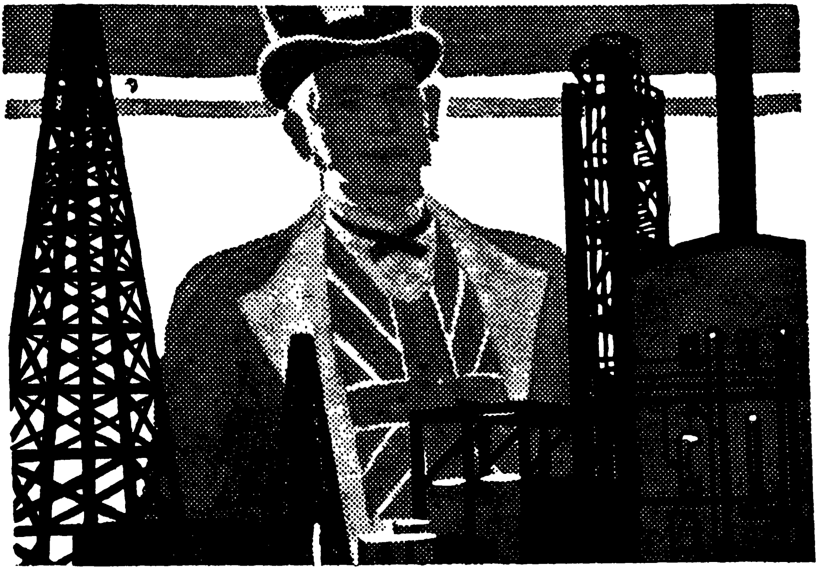
South Australia is not a dairying State, but this does not condone in any way the unsatisfactory attitude of the manufacturers, nor the slipshod, dilatory conduct of a great many of the producers.

In regard to manufacturers, there has been, and still is, too much desire to get cream customers to the detriment of a quality product, or the payment of a better price for a superior raw product. While these conditions go on, farmers cannot be expected to take the interest in their cream that they should.

One of the chief causes of concern to-day to the cream supplier is the payment for butterfat. In payment for butterfat or commercial butter the sum total is the same, but it is difficult to convince the ordinary dairyman that this is so, and this discontent will continue until butter is paid for on the principle of commercial butter. To give an example, if a farmer sends 50lbs. of cream to the factory, and it is of 40 per cent. test, he gets a return of 20lbs. butterfat. He churns 50lbs. of cream and may get from 25lbs. to 30lbs. of butter. This farmer does not take into consideration that he may have from 10 to 20 per cent. of water and salt in his churning, and he immediately comes to the conclusion that the factory is robbing him, and he becomes another discontented supplier. The sooner payment is made for commercial butter the sooner will cream suppliers be contented.

If the supplier is contented then he will take more interest in his product, and many of them to-day are producing cream and milk under very unhygienic conditions. All milking sheds should be built to face the north, to get a maximum of sunlight in them. Every shed should have an impervious floor of either brick or concrete with a 3in. slope from the manger to drain at the outside so that it can be properly washed. If the splashes of milk from milking are allowed to accumulate on the floor, they become a breeding ground for germs. All udders should be clipped around the base of the teats, so that they can be thoroughly washed before milking; an ordinary pair of barber's clippers is the best for this job.

Where cream or milk is left at the wayside to be picked up by lorries it should have proper shelters where it can be kept from the sun, and these shelters should be so constructed as to cause a continual draught to pass through, which has a cooling effect. All cream kept at the farm should be stored where it receives a stream of fresh air. If the weather is hot, a wet bag should be placed around the can, which is easily kept damp by throwing a bucket of water on the bag. In the more thickly populated districts, where several firms are drawing cream supplies, it should be possible for all cream to be picked up by one lorry. By this means it would be possible to get supplies to the factories more often than is the case to-day. Another point to be seriously considered in the economic production of milk and cream is the contentment of the dairy herd, and one of the greatest factors in securing this is to see that every animal is dehorned.



[*Papers Read at Conferences.*]

THE DEVELOPMENT OF THE DAIRY INDUSTRY IN DENMARK.

[L. M. HANSEN, Mount Barker.]

The development of modern dairy farming in Denmark in the last quarter of the nineteenth century was a natural consequence of the altered circumstances of agricultural production, but it was also one of the results of the free trade policy which, contrary to most other Continental European countries, was chosen by Denmark.

Of Denmark's total area of about 11,000,000 acres, about 76 per cent. is utilised for agricultural and horticultural purposes, 9 per cent. is timbered, while the greater part of the remainder comprises areas that are useless for cultivation and agriculture.

In 1861 the number of cows was 757,000; since then the number has been more than doubled, and the average annual yield of milk per cow more than trebled. The total annual output of butter-fat per cow has become four times as high. The increase in the quantity of butter-fat per cow is mostly due to the increased milk yield, but also to the fact that from 1861 to 1929 the milk has become richer. In the former year, a quantity of about 32lbs. of milk was required to produce 1lb. of butter. In 1929 the Danish co-operative dairies on an average used only three-quarters as much, or 23.6lbs. of milk per lb. of butter.

The total output of milk in Denmark in 1929 was over 11,000,000lbs. In the same year the total butter-fat produced amounted to about 410,000,000lbs., corresponding to about 470,000,000lbs. of butter, or about 135lbs. of butter per head of population. The average butter yield per cow for the whole of the country's stock of cows was in 1930 nearly 310lbs. In the same year Denmark's butter exports totalled about 375,000,000lbs., or about 230lbs. for every cow in the country.

CO-OPERATIVE EFFORT.

When the mechanical separator was invented it became possible to establish dairy factories. The result was that a number of privately owned factories were built; but from 1882 the establishment of typical co-operative dairy factories began.

How quickly the co-operative system won its way into Danish dairy farming is seen from the fact that up to 1890, *i.e.*, in the course of eight years, about 700 dairies were established, or nearly as many as in the next 40 years. It is now estimated that more than 90 per cent. of Denmark's 215,000 farmers have joined the co-operative dairies, and these now handle about 90 per cent. of the country's total quantity of milk, and produce about 93 per cent. of the whole butter output, in addition to the greater part of cheese.

That the co-operative principle so decidedly secured the leading position in Danish dairying is the result of several coinciding circumstances, of which only one or two of the most important need be referred to here. As the co-operative dairies from the very beginning were organised in the poorer districts of Western Jutland, they naturally were founded on very democratic principles. In the preceding years the political struggle for equal suffrage was in the foreground, and in this struggle the great majority of small farmers were on the democratic side. At about this time an intellectual and educational movement began among the farming population, and prepared the mind of the farmer for the work to be done in good fellowship and co-operation.

It was considered natural and right that co-operative dairy factories should be organised on a fully democratic basis. Each member received only one vote in all the affairs of the dairy, regardless of whether he had few or many cows, and the endeavours that have since been made to change this very democratic form of management and to allow the influence of the individual member to be determined by the quantity of milk he supplied (the number of his cows) were unsuccessful.

[*Papers Read at Conferences.*]

Another reason why the co-operative system expanded so rapidly was the economic necessity of changing over from grain production to dairies. The milk suppliers—including many thousands of small holders—could obtain the same advantage as the big producers, both with regard to technical handling and quality production and with regard to the marketing of their products.

In the course of time the number of private dairies has steadily declined, and it is characteristic that the so-called estate dairies now, 50 years later, have practically disappeared. In 1914 there were only 16 left, and since then several of these have closed down.

This explains the fact that modern dairy farming requires such a large and costly technical plant that even the biggest farmers have too small a quantity of milk to form the basis of a fully up-to-date and sufficiently economic dairy factory alone.

It appears from the material sent in to the Bureau of Dairy Statistics by the co-operative dairies, that in 1914 the latter had on an average handled 580,000galls., and in 1929, 740,000galls. of whole milk per dairy. According to size they may be divided into the following groups:—

	Number.	Per cent.
Over 1 million gallons of milk	103	13
.8 - 1 million gallons of milk	111	14
.6–.8 million gallons of milk	206	26
.4–.6 million gallons of milk	226	28
.2- .4 million gallons of milk	136	17
Under .2 million gallons of milk	14	2

The factories of the size of .8 to 1,000,000galls. have shown the best returns to the farmers, apparently on account of the shorter collecting radius.

Dairy Instruction.

These factories are spread over all the country, and practically every village has its own factory. All factories receive milk only and the average output per week per factory is 2 tons of butter, and is practically the same from week to week the whole year round. The radius of collecting is about three miles, and this accounts to a great extent for the good quality of Danish butter. The Danish farmer does not believe in having his product spoiled before it reaches the factory. The rapid development of the modern system of dairying brought to the front the problem of theoretical training for staffs of the dairy factories, and in 1887 and 1889, respectively, special dairy sections were established at Ladelund and Dalum schools, and these sections are still being maintained.

Every year these two schools—which are both run as private schools with a small State grant—have an eight-months' theoretical course. The instruction comprises the natural sciences, chemistry, physics, micro-biology, anatomy, and the physiology of nutrition, and also the special subjects such as ordinary dairying, dairy machinery, dairy management, bookkeeping, &c. The course ends with a final examination under public control, on the passing of which the pupils are given a certificate. Students without means may obtain State scholarships while taking these courses. The practical training has always taken place at the factories. At first this part of the instruction was more or less casual, but since 1911 the Danish Dairy Managers' Society (an organisation of dairy managers from all over the country, who, besides working in the interests of their profession, also take great interest in the technical progress of the dairy industry) has had a systematic and organised apprentice period of four years. At the end of their apprenticeship, the young dairymen receive a certificate, after which, as a rule, they work for two to five years as assistant dairymen, and then complete their training by going through the above-mentioned eight months' theoretical course at one of the dairy schools. It is from among these practical and theoretically trained dairymen that the dairy-manager class is recruited.

Mention should be made of the Government's Experimental Dairy, where the work is exclusively for the purpose of promoting technical progress in the dairy industry, while an association embracing the whole country, the Central Organisation of Danish Dairy Associations, takes care of the general interests of the industry.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

1935 PRUNING COMPETITIONS.

McLAREN FLAT.

From a small competition primarily inaugurated with the object of instructing boys and youths in the treatment of fruit trees and vines, the Pruning Competitions annually conducted under the auspices of the McLaren Flat Branch of the Agricultural Bureau have developed into one of the outstanding fixtures in the horticultural activities of the southern districts of the State. On the cessation of the Royal Agricultural Society's management of the Reynella Competitions in 1931, the McLaren Flat Bureau undertook the management of the Competitions, and since that year has managed them with marked success. Mr. Tom Wait, who has been secretary of the Competitions for five years, paid a tribute to the committee which had assisted him. He referred especially to the work of the chairman (Mr. Cyril Robertson). Trophies for the prize winners in the various sections were given by the Royal Agricultural Society, Messrs. J. Ingoldby, Thos. Hardy & Sons, Tatachilla Vineyards, Emu Wine Company, F. Kay, Gollin & Co., Grape Vendors' Association, A. Bruce, L. Townsend, McLaren Vale Fruit Packers, and Mr. and Mrs. E. Hockney. Vineyards and orchards belonging to Messrs. J. Ingoldby, F. B. Wilson, Chas. Elliott, and R. Nottage were placed at the disposal of the Bureau for the Competitions.

VINE SECTION.

Competitor.	Spur.	Rod.	Total.
B. Elliott	91	92	183
F. Grohs	84	96	180
C. Air	86	94	180
Ron Ward	86	90	176
O. Manser	85	91	176
W. Stillwell	88	86½	174½
R. Sibley	82	92	174
C. Sigston	83	91	174
H. Sparrow	87	86	173
S. Maple	85	87	172
B. Powell	82	90	172
A. Air	82	89	171
D. Broughton	86	85	171
L. Rayner	84	87	171
R. Stanfield	86	85	171
R. J. Deane	82	88	170
Ron Elliott	82	88	170
G. H. Wright	87	83	170
A. Jones	82	88	170
K. Broughton	85	85	170
R. Bilney	83	87	170
R. Low	86	84	170
H. Cox	86	83	169
L. Ward	82	87	169
W. Harris	83	86	169
H. Easton	83	86	169
P. Roe	83	85	168
F. Price	83	85	168
Rex Ward	78	90	168
N. Sparrow	89	79	168
A. W. Osmond	81	87	168
W. C. Ledgard	80	88	168
T. Burgan	82	85	167
R. Elliott	78	89	167
H. Eatts	80	87	167
F. Schurgott	83	84	167
Ralph Townsend	81	86	167
E. R. Grohs	82	85	167
M. Robertson	82	84	166
A. Cooper	81	85	166
H. F. Alexander	80	86	166

VINE SECTION—*continued.*

Competitor.	Spur.	Rod.	Total.
I. Dyer	87	79	166
F. M. Elliott	85	81	166
A. Baxter	82	84	166
J. Burgan	77	88	165
W. Osmond	80	85	165
C. Ward	84	81	165
R. Gun	82	83	165
P. Wapper	82	83	165
R. Le Poidevin	84	81	165
H. Rayner	80	84	164
L. Manser	80	84	164
J. Ordish	84	80	164
K. Robertson	84	80	164
Reg. Townsend	82	82	164
W. Kyloh	79	85	164
Ron Wickham	82	82	164
C. Bruce	79	84	163
H. Wickham	78	85	163
L. Whitehead	81	82	163
J. Pearson	78	85	163
A. Tickle	81	81	162
C. Cassetti	80	82	162
H. Trevelion	80	81	161
E. Waye	83	78	161
E. Ingram	80	81	161
E. Baldock	82	78	160
R. Forrest	82	78	160
R. Tickle	80	79	169
G. Wright	78	80	158
P. Penny	74	83	157
H. Storer	76	75	151
A. Powell	72	73	145

Messrs. H. H. Orchard (District Horticultural Instructor) and G. Cox, who judged the spur section, said the chief fault of the pruners was in overtaxing the strength of the vines and leaving three buds on the spurs. Generally speaking, the standard of the work was not equal to that of last year, but that of the winner was outstanding.

Messrs. J. Williams (Viticultural Instructor Roseworthy College) and E. Strout said that in the rod pruning there was a noticeable improvement in the work in the section which they judged. The shaping of the vines, however, was faulty. Pruners showed a tendency to select fruiting rods remote from the wire when more suitable rods in closer proximity to the wire could have been chosen.

CURRANT.

Competitor.	Points.
R. Stanfield	91
C. Air	90
Reg. Townsend	89
J. Sigston	88
B. Powell	88
Ron Ward	88
F. M. Elliott	88
T. Burgan	88
W. Ward	87
K. Robertson	87
C. Sigston	85
C. Bruce	85
Reg. Elliott	85
Reg. Low	85
P. Rowe	85
H. Eatts	85
K. Broughton	85
Ralph Townsend	85
C. Ward	84
R. J. Deane	84

CURRANT—*continued.*

Competitor.	Points.
A. Trembath	84
R. Wickham	84
L. Ward	83
M. Robertson	83
H. Rayner	82
H. H. Wickham	82
C. Casseti	82
P. Penny	82
S. Maple	81
L. Whitehead	81
W. Ledgard	80
Bick Elliott	80
L. Rayner	79
D. Broughton	78
W. Kyloh	76
N. Dyer	76
E. Ingram	74
A. Air	73
A. Powell	71
A. M. Osmond	59

Mr. H. Howard, of Langhorne's Creek, and Messrs. G. Dowdell and N. Low said they were disappointed with the treatment of the currant vines and the cutting left much to be desired; in many instances spurs were left too long. The saw work was definitely poor.

TREE SECTION.

Competitor.	Apricot.	Prune.	Total.
L. Ward	89	87	176
K. Robertson	87	86	173
R. Townsend	85	87	172
D. Nicol	80	90	170
B. Powell	85	85	170
A. Trembath	87	83	170
F. M. Elliott	91	79	170
Reg. Elliott	81	89	170
Bick Elliott	85	83	168
W. C. Ledgard	83	84	167
J. Sigston	84	83	167
G. Ward	83	84	167
H. Wickham	—	84	84
H. Eatts	—	82	82

"The pruning of apricots was very even, and all competitors showed a good knowledge of the treatment necessary for this tree," said the judges, Messrs. E. Leishman and C. Pollitt, of the Department of Agriculture. "The work was highly commendable, particularly that of the winner. In the prune section competitors had been a little too drastic on the fruiting wood."

JUNIOR COMPETITIONS.

Boys, 15-18.—Currant—S. Penny, 96; G. Townsend, 90½; E. Penny, 90. S. Penny, rod 93, spur 86 (189); E. Penny, 91, 95 (186); N. Sparrow, 92, 88 (180); O. Wright, 89, 86 (175); G. Townsend, 87, 86 (173); R. Le Poidevin, 88, 80 (168); D. Broughton, 85, 82 (167); F. Stillwell, 78, 83 (161); C. Oakley, 83 s.

Boys, 12-15.—I. Bruce, spur 83, rod 79 (162); K. Guerin, 81, 80 (161); R. Kyloh, 77, 82 (159); I. Chapman, 76, 80 (156); J. Dowdell, 81, 75 (156); J. Warren, 78, 74 (152); W. Elliott, 76, 76 (152); R. Elliott, 76, 70 (146). Spurs only—D. Elliott, 77; L. Stillwell, 77; D. Stillwell, 75; G. Ricks, 70.

Boys, under 12.—Spurs—D. Cox, 81; P. Elliott, 74; N. Chapman, 74; H. Powell, [illegible]; J. Stillwell, 64.

The boys' classes were judged by Messrs. G. Ward, G. Dowdell, F. Schurgott, H. Cox, and L. Sparrow.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of June, 1935, also the average precipitation for June, and the average annual rainfall.

Station.	For June, 1935.	Av'ge. for June.	To end June, 1935.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0·93	0·60	1·97	4·66
Marree	0·96	0·69	1·72	5·88
Farina	0·62	0·83	1·65	6·43
Copley	0·51	1·04	1·31	7·87
Beltana	0·36	1·05	1·39	8·48
Blinman	0·49	1·57	1·34	11·86
Hookina	0·43	1·72	1·91	11·25
Hawker	0·46	1·87	2·06	12·26
Wilson	0·43	1·76	2·30	11·79
Gordon	0·44	1·43	2·00	10·53
Quorn	0·66	1·78	2·36	13·22
Port Augusta	0·40	1·14	4·19	9·44
Bruce	0·23	1·31	2·38	9·87
Hammond	0·43	1·37	3·12	11·21
Wilmington	1·38	2·39	4·41	17·32
Willowie	0·93	1·60	3·65	12·25
Melrose	2·08	3·28	8·61	22·88
Booleroo Centre	0·96	2·13	4·85	15·21
Port Germein	1·11	1·50	5·33	12·53
Wirrabara	1·89	2·67	5·92	19·29
Appila	1·11	1·77	6·41	14·65
Cradock	0·31	1·54	1·96	10·82
Carrieton	0·66	1·63	3·03	12·23
Johnburg	0·39	1·30	2·16	10·58
Eurelia	0·60	1·65	2·43	12·79
Orroroo	0·94	1·75	3·41	13·20
Nackara	0·32	1·37	2·89	11 09
Black Rock	0·71	1·55	2·82	12·37
Oodlawirra	0·51	1·29	2·81	11·68
Peterborough	0·76	1·57	4·14	13·22
Yongala	1·31	1·80	5·02	14·44
North-East.				
Yunta	0·14	0·96	2·64	8·55
Waukaringa	0·35	1·01	1·99	7·94
Mannahill	0·54	0·89	1·67	8·20
Cockburn	0·14	0·93	1·22	7·96
Broken Hill, N.S.W.	0·20	1·13	1·49	9·56
Lower North.				
Port Pirie	1·37	1·73	7·05	13·21
Port Broughton	1·51	2·00	8·20	13·88
Bute	1·62	2·25	6·20	15·44
Laura	1·44	2·38	7·77	17·95
Caltowie	1·33	2·04	6·44	16·74
Jamestown	1·82	2·27	6·85	17·69
Gladstone	0·98	2·05	7·52	16·29
Crystal Brook	1·68	2·13	9·25	15·78
Georgetown	1·73	2·41	7·93	18·37
Narridy	1·52	2·14	7·32	15·82
Redhill	2·57	2·36	8·99	16·59
Spalding	1·74	2·50	7·72	18·88
Gulnare	1·87	2·51	7·53	18·68
Yacka	2·17	2·11	7·71	15·39
Koolunga	1·71	2·10	7·23	15·38
Snowtown	1·46	2·22	6·84	15·74

Station.	For June, 1935.	Av'ge. for June.	To end June, 1935.	Av'ge. Annual Rainfall.
Lower North—*continued*.				
Brinkworth	1·46	2·26	7·75	15·82
Blyth	2·16	2·20	9·30	16·78
Clare	2·89	3·35	11·06	24·51
Mintaro	2·33	3·29	10·62	23·42
Watervale	2·84	3·71	12·91	26·80
Auburn	2·62	3·11	11·08	23·98
Hoyleton	1·53	2·21	8·33	17·33
Balaklava	0·99	1·90	6·55	15·46
Port Wakefield	0·85	1·62	6·39	12·94
Terowie	1·06	1·52	3·86	13·35
Yarcowie	1·05	1·64	4·57	13·59
Hallett	1·73	2·12	7·23	16·46
Mount Bryan	2·40	2·23	7·78	16·83
Kooringa	2·05	2·37	6·78	17·85
Farrell's Flat	2·45	2·52	7·59	18·61
West of Murray Range.				
Manoora	1·85	2·45	8·42	18·92
Saddleworth	1·93	2·48	8·61	19·60
Marrabel	2·08	2·66	8·68	19·96
Riverton	2·06	2·72	9·88	20·81
Tarlee	1·62	2·30	7·20	18·10
Stockport	1·51	2·23	8·25	16·93
Hamley Bridge	1·29	2·24	7·31	16·54
Kapunda	1·41	2·47	7·08	19·79
Freeling	1·62	2·38	8·42	17·83
Greenock	2·22	2·86	8·95	21·53
Truro	2·04	2·69	7·52	19·89
Stockwell	2·28	2·77	8·09	20·13
Nuriootpa	3·26	2·90	10·14	20·72
Angaston	3·47	3·14	9·68	22·42
Tanunda	2·82	3·18	10·50	22·02
Lyndoch	2·91	3·53	9·97	23·40
Williamstown	3·27	4·62	10·79	27·77
Adelaide Plains.				
Owen	1·83	1·47	7·76	14·66
Mallala	1·42	2·28	6·07	16·56
Roseworthy	1·88	2·42	7·96	17·40
Gawler	1·72	2·58	7·46	18·91
Two Wells	1·88	2·28	9·55	15·75
Virginia	1·65	2·48	8·16	17·18
Smithfield	1·68	2·25	8·26	17·64
Salisbury	2·31	2·73	8·60	18·56
Adelaide	2·68	3·09	10·18	21·15
Glen Osmond	2·92	4·20	11·19	26·05
Magill	2·91	3·98	10·73	25·53
Mount Lofty Ranges.				
Teatree Gully	3·13	4·37	11·92	27·20
Stirling West	7·13	7·94	23·29	47·09
Uraidla	6·15	7·40	19·50	44·19
Clarendon	3·71	5·18	14·65	32·88
Happy Val'y Res.	3·39	—	11·76	—
Morphett Vale	2·51	3·38	10·33	22·66
Noarlunga	2·52	3·12	9·70	20·37
Willunga	3·44	3·93	11·35	26·02
Aldinga	2·71	3·20	8·62	20·27

RAINFALL—*continued.*

Station.	For June, 1935.	Av'ge. for June.	To end June, 1935.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—*continued.*				
Myponga	5·26	4·66	16·96	29·50
Inman Valley	4·42	—	14·52	—
Yankalilla	3·07	3·76	8·77	22·83
Mount Compass	3·78	—	—	—
Mount Pleasant	4·11	4·19	10·65	27·23
Birdwood	3·96	4·65	11·88	29·21
Gumeracha	4·75	5·30	13·83	33·41
Millbrook Res.	5·25	5·17	16·28	34·68
Tweedvale	5·88	6·04	15·82	35·99
Woodside	5·53	5·18	13·92	32·31
Ambleside	5·72	5·53	15·17	34·90
Nairne	4·09	4·15	11·93	28·22
Mount Barker	3·97	4·50	12·73	31·31
Echunga	4·96	5·19	15·26	33·30
Macclesfield	3·56	4·41	12·52	30·43
Meadows	4·37	5·46	14·82	36·16
Strathalbyn	2·29	2·50	7·44	19·31
Murray Fats and Valley				
Meningie	2·46	2·64	8·01	18·37
Milang	1·81	2·11	5·69	14·91
Langhorne's Ck.	1·54	1·90	6·25	14·87
Wellington	1·52	1·90	6·80	14 65
Tailem Bend	1·66	1·78	7·00	15·06
Murray Bridge	1·34	1·64	4·99	13·56
Callington	1·26	1·95	4·77	15·19
Mannum	1·04	1·37	4·81	11·49
Palmer	1·72	1·93	5·50	15·63
Sedan	0·77	1·58	3·49	12·11
Swan Reach	0·79	1·22	3·56	10·64
Blanchetown	0·86	1·19	3·15	11·01
Eudunda	1·85	2·24	7·83	17·17
Pt. Pass	2·03	1·77	7·45	—
Sutherlands	0·52	1·38	3·10	10·84
Morgan	0·67	0·99	2·97	9·17
Waikerie	0·84	1·15	3·63	9·65
Overland Corner	0·55	1·12	2·68	10·32
Loxton	0·58	1·21	3·23	11·54
Berri	0·55	1·06	4·06	10·17
Renmark	0·63	1·11	4·45	10·41
West of Spencer's Gulf				
Eucla	1·02	1·13	6·68	9·96
Nullarbor	0·17	1·37	4·15	8·81
Fowler's Bay	1·43	2·18	6·10	11·94
Penong	1·09	1 91	5·38	12·27
Koonibba	1·32	1·78	6·10	12·13
Denial Bay	1·04	1·75	5·11	11·36
Ceduna	1·01	1·55	5·65	10·16
Smoky Bay	1·21	1·79	5·46	10·53
Wirrulla	1·36	1·71	7·09	10·54
Streaky Bay	2·23	2·83	8·78	14·88
Chandada	1·68	1·75	6·69	—
Minnipa	1·35	2·20	6·44	14·06
Kyancutta	1·61	1·67	7·36	—
Talia	1·67	2·70	7·08	14·76
Port Elliston	2·85	3·24	9·68	16·54
Lock	1·63	2·47	7·69	16·52
Mount Hope	4·21	—	10·25	—
Yeelanna	3·01	2·50	10·24	15·94
Cummins	3·71	2·94	9·81	17·60
Port Lincoln	2·51	3·17	7·90	19·42
Tumby	1·95	1·87	6·07	14·12
Ungarra	2·02	2·38	7·82	16·85
Port Neill	1·17	1·75	5·79	13·09
West of Spencer's Gulf—*continued.*				
Arno Bay	0·83	1·60	6·43	12·65
Rudall	1·82	1·48	7·41	12·64
Cleve	1·84	1·93	8·58	14·83
Cowell	0·73	1·27	4·38	11·07
Miltalie	1·32	1·68	8·08	13·67
Mangalo	1·09	1·74	6·64	13·[illegible]1
Darke's Peak	2·03	2·20	8·56	15·18
Kimba	1·43	1·47	6·18	11·82
Yorke Peninsula.				
Wallaroo	1·33	2·07	7·67	13·98
Kadina	2·10	2·25	8·53	15·64
Moonta	1·18	2·20	6·74	15·06
Paskeville	1·84	2·31	6·74	15·49
Maitland	2·03	3·02	9·75	19·90
Ardrossan	2·04	2·01	6·19	13·97
Port Victoria	1·82	2·29	6·99	15·44
Curramulka	1·84	2·74	6·66	17·87
Minlaton	2·35	2·78	6·99	17·79
Port Vincent	1·57	2·29	5·12	14·43
Brentwood	2·26	2·32	7·31	15·55
Stansbury	2·13	2·47	5·97	16·82
Warooka	2·51	2·68	7·04	17·49
Yorketown	2·70	2·59	8·93	16·88
Edithburgh	2·20	2·37	6·54	16·37
South and South-East.				
Cape Borda	5·69	4·58	14·25	24·82
Kingscote	3·50	2·99	9·40	19·14
Penneshaw	3·10	2·73	8·87	18·92
Victor Harbour	3·59	3·17	9·34	21·37
Port Elliot	2·27	2·82	7·59	19·93
Goolwa	2·12	2·43	6·80	17·85
Maggea	0·62	1·12	3·70	10·04
Copeville	1·43	1·37	4·90	11·51
Claypans	1·14	1·02	4·02	10 38
Meribah	1·02	1·16	4·02	11·31
Alawoona	0·83	1·23	3·70	10·36
Caliph	0·70	1·06	3·60	—
Mindarie	0·96	1·44	4·06	12·21
Sandalwood	1·30	1·71	5·39	13·66
Karoonda	1·47	1·69	6·02	14·36
Pinnaroo	0·96	1·65	3·59	14·43
Parilla	1·19	1·69	4·94	13·82
Lameroo	1·34	1·92	5·16	15·97
Parrakie	2·08	1·68	7·01	14·62
Geranium	2·24	1·90	7·63	16·51
Peake	1·78	1·89	7·99	16·01
Cooke's Plains	1·89	2·02	7·18	15·30
Coomandook	2·15	2·24	7·69	17·09
Coonalpyn	1·96	2·31	8·69	17·61
Tintinara	2·16	2·46	8·99	18·71
Keith	2·32	2·19	7·75	17·92
Bordertown	2·81	2·53	8·35	19·21
Wolseley	2·73	2·38	7·87	18·49
Frances	3·19	2·50	10·03	20·11
Naracoorte	3·21	3·20	11·81	22·66
Penola	2·88	3·51	11·60	26·01
Lucindale	4·44	3·47	13·84	23·34
Kingston	3·57	3·88	11·62	24·28
Robe	4·23	4·01	13·76	24·67
Beachport	4·07	4·62	14·27	27·09
Millicent	4·73	4·59	16·51	29·79
Kalangadoo	3·20	4·08	14·27	32·28
Mount Gambier	2·68	3·97	12·35	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.	
		July	Aug.
Adelaide	—	—	—
Alawoona	—	—	—
Allandale East	1560	11	8
Alma	—	—	—
Appila-Yarrowie	—	5	2
Arthurton	—	—	—
Ashbourne	—	10	7
Auburn Women's	—	R	30
Balaklava	—	28	—
Balhannah	—	—	—
Balhannah Women's	—	17	21
Balumbah	—	—	—
Balumbah Women's	—	3	7
Baroota	—	8	12
Beetaloo Valley	—	15	12
Belalie Women's	—	9	13
Berri	—	17	14
Belvidere	—	—	—
Blackheath	—	18	15
Black Rock	—	—	—
Black Springs	1563	9	13
Blackwood	—	8	12
Blyth	—	26	23
Booborowie	—	15	12
Booleroo Centre	—	12	9
Boolgun	—	—	—
Boor's Plains	—	4	1
Boor's Plains Women's	—	—	—
Borrika	—	—	—
Bowhill	—	15	12
Brentwood	—	4	1
Brinkley	—	10	14
Brinkworth	—	15	12
Brownlow	—	17	14
Buchanan	—	—	—
Bute	—	18	15
Butler	—	—	—
Caliph	—	2	6
Caralue	—	10	7
Carey's Gully	—	1	5
Carrow	—	10	14
Ceduna	—	—	—
Chandada	—	—	—
Chapman's Bore	—	15	12
Charra	—	—	—
Cherry Gardens	—	13	10
Chilpuddie Rock	—	—	—
Clare Women's	—	—	—
Clarendon	—	15	12
Cleve	—	6	3
Collie	—	3	7
Coomandook	—	26	30
Coonawarra	—	18	15
Coonawarra Women's	—	17	21
Cummins	—	12	9
Cungena	—	4	1
Currency Creek	—	15	12
Dudley	—	—	—
Echunga	—	10	14
Elbow Hill	—	11	8
Eudunda	—	1	5
Eurelia	—	13	10
Eurelia Women's	—	3	7
Farrell's Flat	—	26	30
Finniss	—	—	—
Frances	—	—	—
Frayville	—	—	—
Gawler River	—	—	—
Georgetown	—	18	10
Geranium	—	27	31
Gladstone	—	12	9
Gladstone Women's	—	16	20
Glencoe	—	9	13
Goode	—	—	—
Goode Women's	—	—	—
Greenock	1563	15	—
Green Patch	1570	11	8
Gumeracha	—	15	12
Hanson	—	16	13
Hartley	—	10	—
Hindmarsh Island	—	—	—
Hope Forest	—	1	5
Hope Forest Women's	—	—	—
Hoyleton	—	15	19
Inman Valley	—	18	15
Jamestown	—	17	21
Jervois	—	11	8
Kalangadoo Women's	—	13	10
Kalangadoo	—	13	10
Kalyan	—	17	21
Kangarilla Women's	—	18	15
Kanni	—	—	—
Kapunda	—	12	9
Karoonda	—	17	14
Keith	—	11	8
Kelly	—	6	3
Ki Ki	—	—	—
Kilkerran	—	15	12
Kongorong	—	15	12
Koolunga	—	—	—
Koonunga	—	—	—
Koppio	—	17	14
Kringin	—	15	12
Kulkawirra	—	9	13
Kyancutta	—	2	6
Kybybolite	1560	11	8
Kybybolite Women's	1592	—	—
Lameroo	—	13	10
Langhorne's Creek	—	10	7
Laura	—	26	30
Laura Bay	—	—	—
Laura Bay Women's	1589	9	—
Lenswood and Forest Range	—	—	—
Light's Pass	—	—	—
Lipson	—	13	10
Lone Gum and Monash	—	18	15
Lone Pine	—	15	12
Longwood	—	—	—
Lowbank	—	10	14
Loxton	—	12	9
Lyndoch	—	16	13
McLaren Flat	—	—	—
McLaren Flat Women's	—	4	1
Macclesfield	—	18	15
MacGillivray	—	16	13
Mallala	—	15	19
Maltee	1567	11	8
Mangalo	1568	—	—
Mangalo Women's	—	10	14
Marama	—	—	—
Meadows	—	10	14
Milang	1587	13	10
Millicent	—	26	30
Millicent Women's	1589	—	—
Miltalie	—	13	10
Monarto South	1590	—	—

INDEX TO BUREAU REPORTS—*continued.*

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm.
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operations.
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Birds.
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
Tobacco Culture		Rams for Farm Flocks.	Farm Buildings.
Meadow Hay.			Layout of the Farm.
Review of the Past Season.			Firefighting.
			Lowering Costs of Production.
			Farm Records.
			Subdivision of the Farm.

SEASONAL REPORTS.

VINES.

At the April meeting of the Greenock Branch, which was attended by 20 members, Mr. H. Helbig, in the course of a report on Vines, said, as a general rule, pruning was not done hard enough because of the very dry conditions which prevailed right from flowering to picking. Ploughing was done earlier than usual and because of the lack of rain only one cultivation was given. Vines were slow in shooting and a very severe hailstorm was responsible for considerable damage. The keen demand for grapes with a general improvement in the wine trade should put growers in better heart for the next season.

FRUIT.

Mr. L. Zimmermann reported that, after a dry winter, Apricots bloomed late in the season and showed a fair crop after flowering for several weeks. Pears flowered heavily, but in many cases failed to set. Apples had an off year. Insect pests were not serious, except in the damage done by Codlin Moth to Apples. Late rains enabled fruit to make a good start, but a dry winter followed. The fruit grown on the drier soils did not make full development. Drying weather was good. Reasonable prices were received for fresh and dried Apricots. The sample of Prunes was fair, but only very poor prices were realised. Early varieties of Peaches filled out well. The sample of Pears was good, due to there being only a light crop. In general, it could be reported that the fruit crop was good, with a marked improvement in prices above those of last year.

CEREALS.

Mr. A. Roenfeldt said that, despite a comparatively low rainfall for the year, many good Hay crops were grown. Generally speaking, late-sown crops gave best results. Crops on good fallow yielded eight bags to the acre. Many heavy crops of Oats were reported in both Hay and Grain. Barley crops were badly damaged by heavy winds. Many farmers were devoting more attention to Peas; sown on stubble land crops of up to 10 bags to the acre were reported. Crops were particularly free from disease. (Secretary, A. Schubert.)

SUMMER GARDENING.

Mr. R. Schulz, one of the young members of the Koolunga Branch, which held a meeting on 15th May, contributed a paper on the subject, "Summer Gardening without Irrigation," in the course of which he stated that properly managed the garden would add very considerably to the revenue of the farm. The soil selected should be one that with good working was capable of retaining moisture. It must be securely fenced. The land must be thoroughly prepared and dressed with stable manue, which should be ploughed in during June. If consolidated by rain, it should be ploughed again and then harrowed before planting. Kale should be planted for feed for cows. Henderson Succession was the best variety of Cabbage; both these crops should be planted in rows 18in. apart during September. Mangolds were also a good feed for cows and did well thinned out to about 8in. apart. For Beetroot the writer recommended Obelisk and Turnip-rooted. A row or two of Pumpkins or Melons should not be forgotten. The best variety of Beans he considered to be Emperor William. Sow the seed in rows about 3ft. apart so that the land can be worked with a horse hoe. Mr. E. Mattischke spoke on the "Care of Hides and Skins." (Secretary, H. Mibus.)

FODDER CONSERVATION.

The June meeting of the Gladstone Branch was held on the 1st of the month. Mr. J. Fisher, in writing on the above subject, said because of recurring drought periods, every livestock owner should endeavour to store fodder during seasons of plenty. Hay was the most popular form of conserved fodder, but it deteriorated in quality the longer it was kept. Sheaved wheaten and oaten straw and cocky chaff were foodstuffs of low feeding quality, but they could be stored for many years, and if fed with a liberal supply of crushed grain would keep stock in good order. Ensilage was the cheapest way to store fodder over long periods and was particularly good for sheep and cows. (Secretary, M. Hoare.)

IMPROVING CREAM QUALITY.

At the meeting of the Wandearah Branch, held on 14th May, Mr. H. Wastell read a paper on the above subject. The writer dealt with the restriction of export butter, the high percentage of low-grade butter produced in this State, the low consumption per head of population, and butter substitutes. Referring to what steps could be taken to improve the quality of the cream Mr. Wastell said bacterial taints were the cause of about 75 per cent. of the lower grade cream that was received at factories. The first step towards reducing this amount was to induce producers to be more careful

so far as the cleanliness of the methods was concerned and to use cream coolers, combined with the sterilisation of milking utensils and separating plant before use. The udders of the cows should be thoroughly cleansed before milking and due regard paid to the condition of the milking sheds to see that floors were clean and properly drained. The speaker invited members to call at the local factory at any time, when he would be pleased to explain any matters of interest to those marketing cream. (Secretary, L. Jacobs.)

FRUIT GROWING.

CITRUS FRUITS.

Mr. J. Arthur read a paper on "Citrus Culture" at the May meeting of the Beetaloo Valley Branch. Holes for orange trees should be dug about 2ft. in diameter and 1ft. deep, leaving the grafting union 3in. above ground level. After the tree had been set in position and when filling in the hole, he recommended mixing some well rotted stable manure with the earth that was to be replaced. Then with sufficient water, the tree should make a good start. The trees should be planted 24ft. apart to provide room for adequate cultivation. Fertiliser in the form of nitrate of soda could be applied for the first year or two, but when the trees came into bearing sulphate of ammonia and stable manure should be applied. Lime also was necessary. Cover crops should be planted between the rows, and for these nothing was better than peas sown at the rate of half a bag with 2cwts. of super to the acre. In the case of big, healthy trees, which always carried light crops, the speaker thought that cincturing would probably induce a heavier setting of fruit. Valencia Late and Washington Navel he thought the best varieties. (Secretary, B. Giddings.)

THE HOME FRUIT GARDEN.

At the meeting of the Booborowie Branch held on 22nd May, Mr. F. Catt, in the course of a paper, said in districts subject to strong winds the provision of a wind-break surrounding the garden was of first importance. For this purpose he recommended either Gum trees or Almond trees. The holes for the trees should be prepared some time before planting actually took place, 21ft. being left between each tree. If best results were to be obtained, thorough cultivation and manuring were necessary. If water was available, the trees should be given an occasional good soaking. If the garden was in a spot moderately well sheltered from frosts, the following trees should do well—Almonds, Apricots, Peaches, Plums, Nectarines, Quinces, and to a lesser degree, Apples. Vines did particularly well, but the fruit had to be covered to protect it from birds. Pruning was necessary to ensure regular cropping. The speaker then gave information relative to the methods of pruning the various kinds of fruit trees. (Secretary, A. Fairchild.)

QUESTION BOX.

Taking the form of a Question Box, the April meeting of the Murraytown Branch was attended by 12 members and visitors. Mr. Tregenza, in reply to a question, recommended 90lbs. of super to the acre for cereals. Mr. Woolford, who had tried the new rubber collar for horses, was not favourably impressed with it. He preferred a sheep pelt as a relief to sore shoulders. Coil springs were also spoken of as being of benefit to relieve the jar from the shoulders. Discussing the profitableness of dairying on the farm, Mr. Pitman believed that it paid to feed the cows during the whole year, but only on products that were grown on the farm. Messrs. Borgas and Joppich supplemented chaff and crushed wheat with linseed meal. The question of the correct time to sow lucerne was also discussed, Mr. M. Scholz speaking in favour of either April or May or a spring sowing. It should not be sown in a cover crop. Mr. Tregenza said he would sow the seed in July so that the young plants would be well established before summer. Mr. Joppich said the soil in which lucerne was to be sown should be very clean. The seed could be mixed with the super and a chain drawn lightly behind the combine to cover the seed. The reason why Florence wheat was not grown more extensively in South Australia, even though it was a wheat of high milling quality, was because it had a tendency to shake, said Mr. W. Scholz. Mr. Pitman, in referring to the question as to the possibility of wheat rising to 4s. per bushel, said that present indications of world's markets did not indicate any permanent increase. Mr. Reichstein forecasted a rise of up to 4s. by July of the current year. (Secretary, E. Pitman.)

OATS V. WHEAT FOR HAY.

The above was the subject of a paper contributed by Mr. K. Masters at the April meeting of the Roberts and Verran Branch. After some years' experience he had come to the conclusion that wheaten hay always opened up in better condition than oaten, principally because mice did not do so much damage to the former. The crops should be cut soon after the flowering stage. From a feeding point of view he favoured

good oaten hay, providing the crop was not cut too ripe. Members, in discussing the paper, generally agreed that oaten hay made the best hay for horses. "Seeding Operations" was the subject of a paper contributed by Mr. A. Ramsey at the meeting held on 14th May. An interesting discussion followed.

FIRE FIGHTING.

Attended by 13 members and two visitors the monthly meeting of the Mount Hope Branch was held on 14th May. Discussing the subject of "Fire Fighting" Mr. A. Myers said the secret of successful fire fighting was in having the district properly organised, so that when word was received of an outbreak no time would be lost in taking steps to combat it. In addition fire breaks should be ploughed. He suggested that a valuable part of the equipment to fight fires would be a motor lorry with a water tank. Mr. H. Adams (District Instructor) addressed the meeting on "Common Ailments of Farm Animals." (Secretary, J. Vigar.)

RECREATION ON THE FARM.

In the course of a short paper on this subject read by Mr. E. James at the May meeting of the Taragora Branch the writer said there was always a tendency for the children of farmers as they grew up to become dissatisfied with farm life and to gravitate towards the cities. In order to overcome that, it was suggested that as much recreation as possible should be introduced in the home. The reading of good books was an education and visits to neighbouring homesteads, where various indoor games could be indulged in, would provide enjoyment for both old and young. Wood carving the writer mentioned as being an interesting hobby and one from which useful articles for the home could be made. Perhaps there was no greater adjunct to home entertainment than the wireless, and with its installation much would be done to create contentment and enjoyment. (Secretary, T. Winters.)

1935 CALENDAR 1935

MAY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	●
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	●	18	19	20	21	22
23	24	25	26	27	28	29
30	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	●	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	●	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	●	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	●
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...

NOVEMBER

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	●	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	●	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

1936 CALENDAR 1936

JANUARY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	●	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	...

FEBRUARY

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	●	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MARCH

S	M	T	W	T	F	S
1	2	3	4	5	6	7
●	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...

APRIL

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	●	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	...	...

MAY

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	●	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

JUNE

S	M	T	W	T	F	S
...	1	2	3	4	●	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

JULY

S	M	T	W	T	F	S
...	...	...	1	2	3	4
●	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

AUGUST

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	●	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	...	...	...	...	..

SEPTEMBER

S	M	T	W	T	F	S
...	...	●	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	...	...	...

OCTOBER

S	M	T	W	T	F	S
...	...	...	...	●	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	●	31

NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
●	30	...	...	...	...	...

DECEMBER

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	●	29	30	31	...	...

● FULL MOON

SHEEP: THE MAINSTAY OF THE FARMER.

The May meeting of the Laura Bay Branch was held at the residence of Mr. W. Bowell and was attended by 14 members. Mr. A. J. Bowell read a paper under the title, "A Few Jumbled Thoughts." Twelve months ago he expressed the opinion that fairly large holdings stocked with sheep was the method of farm management most likely to assist wheatgrowers in getting out of their difficulties. He stressed the importance of making adequate provision for water and the conservation of fodder if the flock was to be managed successfully. The large holding would naturally have to be cropped for several years to get rid of shoots, and for that purpose he recommended oats. The sheep would also assist in clearing off some of the natural growth. A meeting was also held on 9th April. This took the form of a Question Box. (Secretary, P. Morrison.)

EFFICIENCY AND THE PLIGHT OF THE FARMER.

The above was the subject of a paper read by Mr. R. Spriggs at the May meeting of the Yadnarie Branch. In the first place, he said the lack of finance made it impossible for the farmer to replace his old machines, which, in quite a number of cases, were almost beyond repair. The horse teams were also far below strength, and fences were in a bad state of repair. The best asset the farmer had at the present time was his flock of sheep. He also drew attention to the repairs that were necessary to farm buildings and harness. On the other hand, he believed that too much poorly prepared land was put under crop. A smaller area of good fallow would be more profitable. (Secretary, E. Spriggs.)

A CRITICISM OF FARM MANAGEMENT.

Twelve members attended the May meeting of the Cungena Branch, when Mr. A. Taylor, in the course of a paper, said during the past 12 months the farmer with marked ability in the management of his farm had come out on top in the Cungena district. His first criticism was levelled at the failure on the part of many farmers to store fodder for their livestock during years of plenty. Lack of proper shelter for livestock from severe weather conditions was another point which farmers overlooked. There was a strong tendency to overstock and sheep were kept in the one paddock for too long a period. Pigs were not naturally filthy animals and were entitled to better attention than they often received. Time and money would be saved if the farming plant was regularly overhauled and the necessary repairs made to all implements and harness. To make the paddocks in first-class working order more time should be spent in stone picking. With the institution of bounties many first-class farmers had been spoilt. Growers were inclined to scratch in their crops. He strongly advocated a tightening up of the traces of farm management. (Secretary, A. Voumard.)

INCREASING YIELDS PER ACRE.

Mr. D. McKenzie read a paper dealing with this subject at the May meeting of the Warramboo Branch. To obtain a higher average yield he was firmly of the opinion that it would be necessary to sow more fallow land. If all wheat were sown on fallow it would be possible for the farmer to start a system of rotation. When this latter was done sheep would follow as a natural consequence. They would clean the fallow and add to its fertility. Seed wheat should be pickled with copper carbonate. With smaller areas under wheat on fallow, heavier dressings of super could be applied. The land in the district of Cungena was capable of higher yields, and attention to the foregoing points would, he believed, bring about the desired result. (Secretary, H. F. Chilman.)

Mr. P. Daniel read a paper on seeding operations.

FARM ECONOMY.

The following are the chief points brought out in a paper on this subject read by Mr. T. Earl at the May meeting of the Allandale East Branch. Before cutting chaff, examine the bags and sew up the holes that are almost certain to be present. Provide a mouse-proof stage on which to build the haystack and so prevent damage by mice. Overhaul all implements before taking them into the field. A good grease for the plough can be made by mixing equal parts of mutton fat and coal tar. Graze all paddocks with sheep before commencing ploughing. The super will be much easier to handle at seeding time if it is first put into small butts. When drilling in oats put in a handful of rape each time the grain box is filled. Oil is an absolutely necessary farm requisite; buy it in 2gall. or 4gall. lots and so effect a saving. Endeavour to so arrange the schedule of farm operations that the right job is done at the right time. (Secretary, R. Laslett.)

"Economy lies not so much in rigidly curtailing all expenditure as in spending wisely and putting money into farming operations that would show more profit" said Mr. M. Harvie in the course of a paper which he read at the May meeting of the Appila Branch. Continuing, he said "it was false economy to continue using farm machinery that was badly worn; in the case of a harvesting implement that would be wasteful. Power farming he though was too expensive at the present price of wheat, but the farmer could safely raise a few foals each year. Harness and machines should be regularly overhauled and any repairs effected. A good set of tools would often enable one to do many jobs on the farm that otherwise would have to be taken to a tradesman. He believed that a very considerable saving could be made by farmers if they bought such requisites as cornsacks, twine, &c., co-operatively. Super bags should be washed and used for the storage of cereals that were kept for seed. Vermin in the form of rats, mice, &c., were often a source of waste, and an endeavour should be made to check the damage they caused."

This subject was also discussed by Mr. D. Gregurke at the March meeting of the Wepowie Branch. He believed the best economy consisted in the wise expenditure of the farm finances. It was not always wise to cut down the expenditure on labour, especially at harvest time. Occasional hours spent in the blacksmith's shop often saved considerable waste time in the field. Neither fence nor buildings should be allowed to become so much out of repair that they involved the expenditure of much money to be made effective. (Secretary, E. Roocke.)

SHEEP MANAGEMENT.

Twenty members and visitors attended the May meeting of the Sutherlands Branch, when a paper on the above subject was contributed by Mr. B. Doecke. The first essential, he said, was a plentiful supply of good water, and the troughs should be cleaned out occasionally. If the flock was kept for breeding, purchase the best animals that finances would allow. Yard the ewes with the rams about November; they will then mate more readily than if left in large paddocks. Crutch the ewes about four weeks before lambing. Flocks of approximately 100 ewes will be found most convenient to handle when the lambs commence to drop. For ewes, the best paddocks should be made available, and he stressed the importance of providing shelter for them. When lambing commences, make a regular tour of inspection and assist any ewes that may be in difficulty. Do not forget at this time to lay baits for foxes. Marking should be done when the lambs are two to three weeks old, doing the work early in the morning. To guard against blowflies, crutching would be of material assistance. A good dressing is waste car oil. At all times handle the sheep carefully. (Secretary, E. Schiller.)

SHEEP BLOWFLY TRAPS.

From experiments that he had conducted with traps, Mr. H. Noske, of Wepowie, at the May meeting of the Branch expressed the opinion that it definitely paid to use traps for blowflies. If every farmer was to use traps the trouble of fly-struck sheep would be greatly reduced.

At the same meeting Mr. L. Jasper contributed a short paper, "Sheep on a Wheat Farm." He said of late years sheep were being given more attention on wheat farms. For their district the only sheep worthy of consideration was the large-frame, plain-bodied Merino. For the farmer with a comparatively small flock the making of the clip into too many lines was to be avoided. (Secretary, E. Roocke.)

WHEAT GROWING OUTSIDE GOYDER'S LINE.

"Generally speaking," said Mr. M. Brown, in the course of a paper on the above subject which he read at the May meeting of the Morchard Branch, "landholders outside of Goyder's line of rainfall would be far better off if they devoted more attention to stock and less to cereal growing." He contended that 2,000 acres of land were necessary on which to make a fair living. Of this holding he could crop 300 acres of fallow a year and carry 700 sheep. On a holding of 1,200 acres, he recommended cropping 250 acres and stocking the remainder to its maximum. Mr. P. Schultz also read a paper, "Travelling as an Aid to Agricultural Knowledge." (Secretary, E. Tilbrook.)

IRRIGATING CURRANT VINES.

At the May meeting of the Ramco Branch, Mr. F. Lewis introduced a discussion on the subject, "Watering Currants after 1st January," in the course of which he said, Gordos required more water than Currants. In the case of the former the more vigorous the growth of the vine the better the fruit; just the reverse was the case with the Currant. The Currant vines should not be watered after the New Year until the fruit had been picked. He thought the vines were more easily cultivated if the

Currants were cut back early. Shed returns indicated that growers who did that had had the worst returns. This year he did not cut back and did not water after the New Year and had had the best results. Mr. C. Boehm disagreed; he always watered after the New Year and the fruit, both in regard to quality and colour, was good. Mr. R. Stanley said if the vines were topped too early the fruit would be red. The end vines of the rows made a vigorous growth and did not colour well. At one time he did not water in the New Year, but now he does. Mr. Lewis advocated taking out the end vines of the rows. Mr. Rogers said he watered his Currants, whilst Mr. Lewis did not, and Mr. Lewis had obtained better Currants and finished drying earlier. (Secretary, J. Odgers.)

SOUTH-EASTERN DISTRICT.

ALLANDALE EAST.

13th June, 1935.—Attendance, 12.

Question Box.—1. "What is the best means of ridding land of ferns?" Mr. Butler: Different soils required different treatment. It was essential to keep rabbits out when treating ferns, as they checked pasture growth and gave the ferns a chance to recover. Mr. W. Laslett: Peas had successfully checked ferns on some soils, but if subterranean clover, &c., could be established, cattle would tramp out the ferns. Mr. T. A. Earl suggested dragging a log over the ferns. 2. "Would it pay to sow a half a bushel less per acre and put the money saved into a heavier dressing of super?" Members were of the opinion that it would be a good proposition to use 60lbs. of oats and 100lbs. of super for sowing up till May, and to use the extra half bushel and lighter dressing from then on. 3. "What is the correct depth to plant potatoes?" It was noticed that potatoes planted to a shallow depth were more susceptible to worms, &c. Members thought that about 4in. was about the correct depth. 4. "What is the best way to keep seed potatoes?" Seed kept well when stacked beneath pine trees, and it was thought that the best means of keeping seed was to keep it dry and let it have as much air as possible. 5. "What is the best time to sow early potatoes?" For garden sowing they could be put in about June, but for paddock sowing it would not be advisable to put them in before September. 6. "Does it pay to put super on all summer fodders?" Mr. S. H. Butler had used super on one-half of a paddock of maize last year but could not notice any difference from the part that had not received super. Members thought that super would not be very effective on summer fodders, except in wet summers, unless put on the ground in the spring. (Secretary, R. T. Laslett.)

KYBYBOLITE (Average annual rainfall, 22in.).

March 19th.—Attendance: 21.

The Cultivation and Management of Our Old Clover Paddocks.—Paper by Mr. J. M. Wray:—"The phenomenal change which our soils have undergone since the advent of scientific treatment by sowing Subterranean clover and top dressing the pasture with superphosphate has brought about an entire change in the management of our farms. The old order of things has passed away; the constant cropping of cereals carrying 1 sheep to 3 acres was common, whereas 3 sheep and more to the acre is now quite a commonplace thing. I find it quite difficult to explain just exactly, or to get complete strangers to conceive just what certain fields were like 26 years ago. However, this very welcome change which has taken place, and of which we are justly proud, because we all have done something to help to bring it about, has in my belief brought us face to face with new difficulties which deserve our most serious consideration. We have been constantly following the improvement of pastures by increasing annually our flocks and herds, whereby our fields present to us at this time of the year more of the sheep yard or cow yard type (whichever stock we have), instead of pasture paddocks. It is this aspect, which presents a most unhealthy as well as an unsightly appearance, which has led me to bring this subject before you, and I solicit your co-operation of thought and expression of opinion that we might help one another and the district generally in dealing with these new problems that confront us. I have been trying during the past year or so to satisfy myself as to a method. The first thought was—grow wheat. A field of about 20 acres was chosen, and as the rain fell early in the autumn we ploughed it, then put the harrows over it at intervals of a few days five times before the seed wheat was sown with about 112lbs. of 45 per cent. superphosphate. The crop was the heaviest that I had so far grown; it fell flat on the ground, and we had great difficulty in getting 9 bags to the acre. The price per bushel was low, and the result was that it did not pay; but I learned that, apart from the poor monetary return, the heavy crop of wheat had seriously impoverished the soil that I had built up, and I am convinced that if

you want to keep your soil in good growing condition you must leave the growing of wheat alone. On the other hand, a crop of oats cut for hay, sown in early July, had no serious ill effects upon the soil. Some time ago I decided to purchase a sundercut to go over the ground in its dry condition and at the first rains, and have used it with great results. The experiment has consisted only on small paddocks up to 20 acres and less. The method is to sow 1½bush. of oats to the acre before or after the sundercut, with 112lbs. of 45 per cent. superphosphate. In 1933 we treated an 18 acre paddock, the rains coming early, and the results were so gratifying that 2 additional paddocks, one of 3 acres and one of 20, and the original 18 acres were put in for feed last year (1934), resulting in the bromes and clovers and Algerian oats making a wonderful mixture of clean, fresh feed off practically clean soil.

Owing to the thick coat of droppings, caused through heavy stocking, we have been seriously troubled with the Cockschafer beetle, a small grub that makes its appearance in early and mid-winter, working through the waste on the surface and destroying hundreds of acres of what should be beautiful pastures. Now this grub does not work or live where the sundercut has thrown the soil over the droppings. As we had considerable loss of pasture in 1933 through this beetle, we noticed that where it had been it did not return, and we bared the pasture off more than usual, until the surface was well kicked up by the hoofs of the sheep, thus leaving no cover, and causing a looseness. The beetle gave us practically no trouble last year. This, of course, can only be done by hand-feeding, which again brings another feature of pasture management.

The gathering in of meadow hay is well known and appreciated; also the chaff feeder, which is found to be another great asset which enables a farmer to eat his paddocks bare, and thus get the full benefit of his previous top dressing, and also gives the sheep an opportunity to walk the burrs out of the soil. Loosening the top surface also creates a dust that assimilates the droppings and lets the sunrays get right on to the soil. This gives nature a chance to clean up before the next heavy pasture makes its appearance. Care must be taken to have plenty of reserve fodder on hand in case the season proves to be a sluggish one at the beginning. This bareing of the fields also gives the sheep an opportunity of getting their hoofs on the real turf, and coupled with the extra exercise the sheep have to make, grows a better hoof, and gives it greater resistance against foot disease.

The cultivation and management of our old Subterranean clover paddocks is making more work, and will continue to do so. The day of sitting down while the wool grows on the sheep's back is past and gone. There is much more to be said. I have only touched on one or two things. Our paddocks are too large in the main, and in the near future smaller paddocks will be the order of the day. What a wonderful plant this Subterranean clover has been to us? It not only provides us with succulent fodder that can be grazed, but provides us with hay, and while doing this it is secretly storing up grain of high fattening strength to carry the stock through the autumn.'' (Secretary, A. S. Shepherd.)

Home Gardening.—The following paper was read by Mr. W. D. Starick at the April meeting:—''If you want to prepare a place for a Home Garden Site, see that it is situated on the east to north-east side of the home. To have any success in growing vegetables for the table you must have it sheltered from the south-east to westerly winds. You have mostly hot winds from the north-west, but that is far easier to combat than the cold frosty winds. Do not have the plot sheltered from the early morning sun.

Preparation of Soil.—I prefer soil of a sandy nature, deep sandy loam, anything from 3ft. to 8ft. deep, with a clay bottom. Clay too near the surface makes the soil too cold during the winter months, and is bad for drainage as well. Iron-stone bottom dries out too quickly and needs too much watering during the summer months. Clay holds the water too long and causes water-logging, which can be overcome by trenching.

Many people make a great mistake by carting away tins, wire, iron, broken glassware, stones and bones, which are most essential to the home garden. This also applies to those who have heavy soil too; do not expect to do this with the whole of the plot which you have selected, only a piece at a time. First of all burn everything. The bone naturally burns up. Bag that up when cold and put aside. The reason why it should be burnt is that it has a better chance to decay and partly dissolve. In a year or so you will be able to grow any class of vegetable of a good maturity, tender, and sweet, and it will take some beating if wanted for show purposes. Dig your trench 2ft. deep; care should be taken to put the surface soil by itself. The width of the trench should be wide enough to be able to walk comfortably in it. Now place your bits of old burnt iron and broken stone or burnt up glass, then some clay; say 2in. of iron, 4in. of Clay, then about 3in. of burnt up tins and bits of wire, then some wood ashes saved from the fireplace, then very little of the clay, and lastly your good soil on top. It would not hurt if you mixed some of the wood ashes and burnt bone with it. The bone needs to be crushed if it is too lumpy.

Seeding Operations.—When sowing seeds of root vegetables, *i.e.*, carrots, parsnips, beetroot, turnips, and swedes, always have some well-rotted farm yard manure which has been heaped up for say about six months, and has been constantly disturbed to kill all the rubbish that grows in it. For root vegetables manure must not be lumpy. Fresh manure is practically of no use to root vegetables, for rubbish grows before the roots' seeds are ready. Spread this manure over the soil. When you prepare the soil for root vegetables, see that you have previously grown lettuce, cabbage, cauliflowers, peas, onions, spinach and leeks. By no means grow root vegetables where potatoes have been grown or any kind of tuber. Root vegetables do wonderfully well where onions, shallots, leeks and garlic have been. The roots will grow all right but they have a bitter taste when cooked if grown where pumpkins or melons have been. Grow onions or peas first, then you will have no after effects. The same applies to tomatoes. You can grow tomatoes after cabbages. Do not plant tomatoes after pumpkins or melons. When preparing soil for root vegetables make beds of about 3ft. wide. The length of the beds depends on the power of water you have to water with. With windmill power by hose or gravitation 12ft. is quite long enough. Do not sow carrots and parsnips in one bed; always sow a full bed of each variety and you will have better results and grow more vegetables in the same bed. Always have your beds 4 to 6in. high or have a drain cut through to that depth. See that the footpath is not too high, for you will use the drains also as footpaths. There may be a rise of about 3in. in the main footpath, but no more than the drains of the beds you have made. The reason for the 3ft. beds is for air, drainage in the winter, and to throw weeds in during the weeding time for them to die. The same applies for the summer; it helps to keep the earth cool when watering on a hot, windy day. I am no believer of watering with a sprinkler on hot windy days, but only when it is calm and not too hot. Always have the beds wide enough to plant 2 rows of cabbages or cauliflowers 6in. apart, or else 3 rows of lettuce or 3 rows of root vegetables or onions. When digging the beds always see that you dig the old drain in. Never use the same drain twice; make half of the bed go each way. Plant piemelons down the paddock on some well worked fallow, and watermelons at home, because of inoculation, as they inoculate very easily. The rows of root vegetables need to be from 8 to 12in. apart.

Cabbages, lettuce and onions do well on very rich soil, but cauliflowers should be planted on unmanured soil, and fed afterwards with liquid manure, an occasional salt bath, and lime and ground oyster shell grit. Cauliflowers will grow where all other plants will die. If you know of some place where there is plenty of mineral in the ground, such as magnesia, plant a crop of cauliflowers in the usual way, manure it, &c., and you will find it will do wonderfully well. The best time for planting root vegetables is from August until the end of October and a late planting from the middle of February until the first week in April. A small sowing of turnips may be done after the middle of June until April of the following year.

When the sowing of cabbage, cauliflower and lettuce is to be made in nursery beds, do not have the beds too rich, but just manured lightly. When they are planted out into the beds (have them richly manured) they will go ahead right away. Nothing is worse than for cabbage or cauliflower plants to go back after planting. They should be a deep green with no yellow or blue tinge. The same applies with the growing of celery, but this plant differs from all others and takes longer to come to maturity—about 9 months or so. Do not plant out in a bed, but in a trench 12in. deep, with well rotted stable manure dug in, with some surface oil mixed through, and 3in. of good soil on top of that again. Plant the celery about 2 or 3 plants wide and about 3 or 4in. apart, depending on the width of the trench. Celery needs a lot of attention, as it has to be earthed up while it is growing in order to grow good, tender, and sweet celery. If grown otherwise it becomes bitter very quickly. Celery does not like "wet feet," and the lighter the soil the clearer the celery.

Asparagus takes about 2 years before coming to maturity. It is cut about 7 to 9in. under the soil. This plant takes a lot of attention, so you can understand why celery and asparagus are expensive when handled over the counter." Secretary, A. S. Shepherd.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Tantanoola	1/6/35	16	Discussion—Calf Club ...	L. J. C. Osborne
Mount Gambier	10/5/35	14	"Insects affecting Pastures"—J. E. Morphett	J. E. Morphett

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Appila	7/6/35	13	"Income Tax Returns"—J. Murchland	E. H. Wurst
Eurelia	27/5/35	—	Address—H. B. Barlow	E. P. Wall
Wilmington	11/6/35	19	"Commercial Law"—S. C. Genders	Chas. Cole
Yandiah	21/5/35	11	Address—C. A. Goddard	O. Borgas
Yandiah	14/6/35	16	Address—E. L. Orchard	O. Borgas
Baroota	10/6/35	12	Discussion—"Hay Itch"	E. W. Hulster
Morchard	14/6/35	11	Annual Meeting	E. T. Tillbrook

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Snowtown	10/6/35	70	Social and Dance	A. R. C. Hocking
Narridy	1/6/35	26	Annual Meeting	J. Klingner
Redhill	18/6/35	19	Discussion	S. A. Pengilly
Jamestown	26/6/35	14	Annual Meeting	R. B. Phillips

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

"Farm Management" was the subject of a paper by Mr. E. Seigert at the monthly meeting held on June 11th. He recommended sowing oats or barley at the opening of the season in order to provide greenfeed for stock. The next operation was to keep the fallows free from weeds either by cultivation or by sheep, which were good scavengers and would also add fertility to the soil. The seed wheat should be graded and dry-pickled as soon as possible after harvest. Farmers should breed their own horses, because a young team could withstand a hard day's work when required. Care should be taken of mares in foal, but they should be worked right up to the time they were ready to foal. A foal should be well cared for after weaning, because a stunted foal would not make a good horse. Cows, pigs, fowls and sheep would help in the upkeep of the farm. When each machine was finished with it should be thoroughly overhauled, repaired where necessary, and placed in a shed instead of being left at the mercy of the weather as was often noticed on farms. (Secretary, K. H. Dunn.)

GREENOCK (Average annual rainfall, 21.57in.).

10th June.—Attendance, 18.

CARE OF THE BREEDING EWE AND MARKING OF LAMBS.—In the course of a paper on this subject, Mr. R. E. R. Lang stated that he preferred a large-frame Merino ewe of good wool quality, *i.e.*, wool of fairly fine texture and of fair staple. Well bred ewes should be chosen, otherwise one would not get good quality wool or a good quality lamb. The best age to breed from a ewe was when she was rising four-tooth. Breeding from a younger ewe would result in a percentage of lambs being lost, because the young ewe would not take care of her lamb as well as would an older ewe. Also where a flock was worried by foxes a young ewe would not fight as well as an older one. Another point against breeding from young ewes was that some lambs might be

lost at lambing, especially if the ewes had been mated to rams whose progeny were subject to large shoulders. *Feeding.*—Breeding ewes should always be kept separate from the other sheep. They should be placed in the best available paddocks near to the homestead, so that they could have as much attention as possible. A frequent change of paddock was advisable, because if they were kept in the one paddock the feed became stale and the ewes would not do so well. Ewes should always be kept in good condition, because a ewe in low condition would not yield good wool or a good lamb. Where feed was not plentiful it would pay to hand feed them on hay-chaff and oats. A suitable ration was about 4lbs. of chaff and 2lbs. of oats per sheep. Hand-fed ewes would give a much better percentage of lambs and would be much stronger and better able to rear the lambs. Sheep nuts were also very good for hand feeding and the ewes did well on them. They were very easy to feed, for it was only necessary to run out a trail of nuts for the sheep to pick up, no troughs being needed. *Crutching and Shearing.*—The shearing of the ewe should be carried out in as short a time and as carefully as possible, taking care not to unduly knock the ewe about and not to leave her in the yard for a couple of days without feed. Ewes should be turned out as soon as possible after shearing, and into a good paddock —not a poor one—so that they could get a stomach full in a short time. They should never be turned out at sunset or losses would occur because of the cold. If the sheep were turned out in time to have a feed before night fell there would be very few, if any, losses. When shearing ewes the legs and crutch should be well cleaned in order to avoid trouble from flies, otherwise the wool became damp and would irritate the sheep, as well as draw flies. It would also mean a loss of wool, because badly stained or very dirty wool was not of much value. Ewes should be crutched just before mating time and again just before lambing. If that were done there would be very little trouble and all the wool would be saleable. Ewes should be crutched again before shearing. The practice of crutching ewes three times a year would result in a saving in trouble from flies and a saving of wool. When crutching prior to lambing every care should be taken not to damage the ewe. *The Mating of the Ewe and the Class of Ram.*—The writer preferred the Border Leicester or Southdown ram because it gave a fast-growing lamb of good quality and shape. The age of the ram should be about the same as that of the ewes mentioned above. The rams should be mated with the ewes in December and left with them until about six weeks before the lambing season. Yarding the ewes every night during the first fortnight the rams were with them would ensure a better percentage and also a more even lambing. If rams were too fat when mated with the ewes they would be a little lazy in working. When yarding ewes during the mating season the dog should not be used unduly so as to excite and frighten the ewes unnecessarily; nor should the dogs be tied too near to the yard or the sheep would become restless and nervous. When the rams were taken out they should be kept separate from the ewes and yolked, or else aprons should be put on them, so that if they found their way in among the ewes during lambing season they could not become a nuisance to the ewes. By mating the ewes in December the lambing would occur during the beginning of May or the latter part of April. With the lambing season occurring early in May, the lambs would be ready for marketing in early September. *The Lambing Period.*—It was advisable to go round the flock each morning and evening to see that all was in order. Dogs should be kept out of the paddock as much as possible during the lambing period, because they disturbed the ewes and lambs and often caused a ewe to leave her lamb. In districts where foxes were troublesome the yarding of the ewes when lambing would be found to result in a great saving and would even pay for the expense of building a yard. Where a yard was built it was advisable to make it fairly large so that the ewes and lambs might have ample space. The entrance gate should be large in order to avoid the sheep being crushed. When letting out the ewes in the morning the gate should be opened and the sheep left to go out at their will. It would be found that they would go out more quietly than if hunted out. *The Marking of the Lambs.*—The yards to be used should be cleaned out, all old refuse being swept up and taken away in order to lessen the likelihood of disease. After cleaning the yards should be sprayed with a disinfectant, such as milk-oil fluid. There should be two yards, one for catching and the other to take the lambs after marking. Drafting the lambs from the ewes before marking was recommended, because it would save much time and the ewes would not be damaged so much. A small yard for the catching would save much unnecessary running both for the lambs and for the man. A good, sunny day should be chosen for marking. The weather was often the cause of losses, for if marking were done on a cold day the lambs would become very stiff and possibly die. On the other hand, if the day was hot one might have trouble with excessive bleeding, which might also cause losses. Ewes and lambs should be yarded about 1-1½ hours prior to the time of starting to mark, which should be not later than 10 o'clock in the

morning and should finish not later than 4 o'clock. Turning out ewes and lambs at this time would give them time to mate up and have a feed before nightfall. Of the several methods of marking the use of the knife was most common and was fairly good. The knife should have a good blade; a real marking knife was preferable. The use of a knife with a bad edge would cause trouble to the person using it as well as to the lamb. There should be a rail erected on the division fence between the two yards so that the lamb could be seated firmly. The marker should be provided with a tin containing some antiseptic so that he could sterilise his knife after each lamb by dipping it in the tin, in order to prevent spreading a disease from one lamb to the next. It would save time if there were two catchers to each marker. The lambs should not be caught any other way than by the leg. Catching by the side or back would injure the skin and cause unnecessary pain to the lambs. The lamb should be held firmly by both hind legs, the legs being drawn well up towards the shoulders. The body of the person holding it should be a backrest for the lamb. If such a method were used, it would be much easier for the marker. When letting the lamb down, it should not be allowed to drop, but should be let down in such a manner that it would land on its legs. A dab of Stockholm tar on the places which had been marked was a preventive of flies and disease. Ear-marking the lambs would help one to distinguish between the sexes when drafting, the wether lamb being marked on the right ear and the ewe lamb on the left. After the ewes and lambs had been turned out into the paddock the next thing to be done was to clean up all refuse from marking, cart it to a heap, and burn it. If left about the yard it would attract flies and might cause disease. The yards should then be disinfected and the rail which was used for marking should be washed with disinfectant. The next day the sheep should be examined to see that all the lambs had returned to their mothers. If possible, it would be a good plan if lambs and ewes were moved to a fresh paddock. If any seemed rather stiff and were lying down, it was advisable to drive the flock slowly around the paddock in order to work off the stiffness from the lambs. The lambs should be all right in a few days, and if care was taken during the marking very little trouble should be experienced. The best age for marking was about one month. If the lambs were left until much older, trouble was often experienced after the marking. (Secretary, A. Schubert.)

TRURO (Average annual rainfall, 29.95in.).

Meeting held 17th June, 1935. Attendance, 13.

PIG RAISING was the subject of the following paper by Mr. J. Miller.—"The farmer who raises pigs must also be prepared to keep at least half a dozen milch cows on his farm, for it is impossible to rear young pigs successfully without the aid of skim milk as part of their daily ration. Of course, there are hundreds of pigs reared where the sows and their litters receive practically no skim milk, but they are always more or less stunted in growth and rough in appearance. For the average farmer I would suggest the keeping of three sows, and these should be so worked that when No. 1 sow has a litter ready for market, No. 2 should be about due to farrow, and No. 3 should be half way through her period of pregnancy. If a larger number of sows is kept they should also be regulated on the method mentioned, as by so doing sows with their litters can be given all the available skim milk and better attention, and a better average market price can be obtained throughout the year.

In selecting young sows for breeding purposes, they should be obtained from big litters if possible, be well grown with plenty of length, and have from 12 to 14 teats. If given good treatment they will be sufficiently developed at the age of eight months to be mated, so that they will have their first litter at about 12 months of age. If a sow proves herself a good, prolific breeder and rears most of her young pigs, do not be hasty in disposing of her on account of age. Some sows are quite good breeders up to eight years of age. On the other hand, if a sow has only small litters, or perhaps has good litters, but is careless and kills half by lying or tramping on them, the best place for her is the market. There is no better time for disposing of the young pigs than off their mothers at the age of from six to eight weeks. Always endeavour to have them in good condition, sleek in coat, and with plenty of bloom, and not, as is often seen in the markets, razor backed, pod bellied, and hairy. This latter type seldom brings a good price.

If you are a breeder of pigs in any number, do not attempt to rear them into porkers or baconers. Leave that to the man who is not a breeder. When the young pigs are taken off their mother, they still require skim milk as part of their ration to retain a good quick growth, which means that if a breeder tries both to breed and rear, he has not sufficient milk and all become more or less stunted. Of course, for the farmer who only breeds from one sow, the position is altogether different.

The work of castrating young pigs should be done at the age of four weeks. Some breeders neglect this work until the pigs are more than twice this age, which is a big mistake, as the pigs develop a coarseness which they carry throughout, and which is easily noticeable to the experienced buyer.

Sows during their idle period can be grazed on barley or other green pasture when this is available, with just a little grain given to keep them in good strong condition. During the summer, when practically no green is available in our district, a sow should be given a little bran prior to her farrowing. This helps to keep the sow in a healthy condition. For the first two or three days after having pigs she should be fed very lightly—a little skim milk and warm water with a small quantity of bran added is sufficient. After the first week the quantity can be increased, and pollard or other crushed grain such as wheat or barley can be given. Whole grain is not very suitable for a sow with a littler.

If a breeder has cement floors in his breeding pens, a false bottom made of soft wood should be provided for the portion of the floor which is under cover. A cement floor without some protection is too cold in the winter-time and will cause serious trouble to the farrowing sow. A railing about 8in. from the floor and the same distance from the wall should be erected in the breeding pen. This helps to protect the young pigs and prevents the mother from lying on them. Galvanized piping is very suitable for this purpose. Always see that your pigs have plenty of good bedding, as it is as essential as good feeding. A pig is a dirty animal, but he likes a good bed. A small pen should be attached to the breeding pen with a small outlet so that the little pigs can be fed by themselves when they are old enough to take feed. Do not on any account attempt in-breeding (close-breeding), as such troubles as small litters and deformed weak pigs will result. The question of the best breed of pigs to rear is a difficult one. We all know that the popular breed of to-day is the Large White Cross, but what will be the most popular in five years' time is difficult to forecast. We must endeavour to breed the type of pig which is most readily sought after and will bring the most money on the market.

When taking young pigs off their mothers wean them gradually for two or three days prior to selling. If they are left on the mother until morning of sale, taken to the market and sold, this may be very detrimental to the sow, as when rearing a litter the milk flow is at its full height, and such trouble as calloused udders is likely to occur if young ones are not weaned gradually. A sow should receive the same consideration in this respect as a cow or a mare." (Secretary, L. S. Davis.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Penwortham ...	29/5/35	18	"Care of Domestic Animals"—P. Modystach	A. R. Jenner
Whitwarta	20/5/35	24	Inaugural Meeting	F. J. G. Collins
Lyndoch	11/6/35	12	Address—Police Sergt. Lenthall	J. S. Hammat
Upper Wakefield	16/5/35	8	Debate—Dry *v.* Wet Pickling	H. W. Gregor
Upper Wakefield	13/6/35	8	Impromptu Speeches, &c.	H. W. Gregor
Truro..........	20/5/35	11	"Care of Farm Implements"—L. Miller	L. S. Davis
Blyth..........	7/6/35	10	Address—W. C. Johnston	R. H. Eime
Blyth..........	12/6/35	—	Cinema Lecture	R. H. Eime
Tarlee	18/6/35	16	"A tour of N.S.W."—C. Kelly	N. L. Clarke
Whitwarta	17/6/35	23	Address—W. C. Johnston	F. J. G. Collins
Whitwarta	18/6/35	12	Address—C. A. Goddard	F. J. G. Collins
Light's Pass ...	17/6/35	60	Address—A. G. Strickland	C. A. Verrall
Brownlow	15/5/35	13	Question Box	A. R. Steinborner
Gawler River ..	17/6/35	22	"Dairy Produce"—J. F. Hewland and J. V. Hudd	K. F. Roediger

YORKE PENINSULA DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Weavers	13/5/35	17	Addresses—R. Hill and F. C. Richards	H. W. Cornish
Weavers	3/6/35	11	Annual Meeting; "Hand Feeding Sheep"—L. Slade	H. W. Cornish

WESTERN DISTRICT.

MALTEE.

21st March.—Attendance, 11.

THE MODERN DRILL.—Paper read by Mr. V. Schwarz:—"It is just 20 years since the combine was introduced into Australian agriculture, this being the name which the farmers promptly gave to the combination of the grain and fertiliser drill with the spring-tine cultivator. Both units of the combination were invented and developed in older countries, but the combination of the two was undoubtedly an Australian idea, and the first sample issued for its field tests in 1915. As is usual with improvement in farm machinery it was the invention of a practical former, in this case R. A. Squires, of Quirindi, New South Wales, who objected to making one coverage of his paddock with the spring-tine and another with the hoe drill when the two jobs might be done at the same time. At first much difficulty was experienced in making and attaching satisfactory sowing "boots" to the spring-tyne, and another great trouble was to make conveyor tubes to take the grain from the hopper to the boot which would not strain and break when the spring-tine encountered and jumped over stumps or stones. *Invention of Conveyor Tubes.*—Again a practical farmer came to the rescue with the invention of the tapered two-piece telescopic rubber tube. These resist all the shocks that develop in rough paddocks, and will last indefinitely if only the farmer will put them in a cool, dark place when they are not in use. When these minor troubles were righted the "combine" was quickly accepted by the wheat-growing community, and the hoe drill became almost a thing of the past. This remark, however, does not apply to the disc drill, which is still in use in all country where an excess of surface rubbish impedes the work at seeding time. The first attraction of the combined drill is that it is cheaper in capital cost than the two implements which it displaces, and further it saves double work for horse and man by working over a given area once only instead of twice, as in former practice. The advocates of this system make greater claims than the above, and are bold enough to assert that earlier germination and an increase in yield are achieved. Most gardeners, as well as farmers, have an unshakeable belief in the advantage of sowing seeds on a firmly compacted surface, and a properly adjusted tyne drill does that. In such a position the seed receives more moisture for germination purposes than when it has both loose soil under and over it. The covering of the seed by the "combine" certainly helps towards increased yield, because no seed is left on the surface for the birds. The sieving action of the tines has the effect of leaving the larger lumps of soil on the surface and shaking the finer particles down on to the seed. This places the clods where they will best break down by weathering, and it also helps to resist wind driftage of the top soil if there is a lengthy period after sowing. *Scattering of Seed.*—One great advantage of the tine drill is that it does not pack all the seeds along one straight, narrow channel as did the hoe drill. On the contrary it scatters them to the extent of 2in. on each side of a centre line. This makes for a better spacing of the seed and probably induces better tillering. In this connection it is interesting to know that experiments were conducted at the Waite Research Institute last year, in which the Australian combined drill was tested against a so-called precision drill from overseas. The result was in favour of the Australian type. In recent years no changes of importance have been made in the design of the combined drill. Standards have been reached, and one generally adhered to in respect to the range of seed and fertiliser which may be sown. The arrangement of the tines in four ranks appears to have been standardised, but it is noticeable that some makes have the sowing boots on the centre ranks, while in others they are attached to the two rear rows. Mostly these implements are used for sowing wheat, oats, and barley, but to a lesser extent they are used to sow peas, beans, millet, and other seeds. For sowing lucerne and

other small, round seeds an additional attachment is needed. This is a small box placed at the rear, and containing sowing devices which are miniature replicas of those used in the large grain box. The combined drill leaves the soil in ridges, and the grains are in rows 7in. apart. Some farmers prefer this from the anti-drifting point of view, but for those who prefer to smooth off the soil, there is available a light type of harrows which may be dragged behind the drill and does not add excessively to the draft. Around seeding time the combine is often used in place of a cultivator, and its first sowing task for the year is often that of drilling in oats on the wheat stubble. (Secretary, E. Schwarz.)

MANGALO (Average annual rainfall, 14in. to 15in.).

AUTUMN FEED.—The following paper entitled, "Can Mangalo Farmers Increase Their Income from Sheep by Providing Autumn Feed?" was read by Mr. F. Coles at the April meeting:—"Mangalo was first known as a hundred in 1907—28 years ago. Since that year about 80 per cent. of the arable land has been permanently cleared and brought under cultivation. During the process the farmers have learned from observation the habits of the natural grasses and of grasses which have come into the district as a result of cultivation, together with the effects on these grasses of the climatic conditions—rain, temperature, and wind. Quite naturally farmers made use of their observations by introducing sheep into the district. Figures taken from the statistics of the hundred of Mangalo point out that this animal has become increasingly popular with the general development of the district, until to-day I believe that farmers look to the sheep for at least 50 per cent. of their revenue. The undermentioned figures clearly illustrate how sheep have increased:—Sheep—1913-14, 25; 1918-19, 1,421; 1923-24, 2,836; 1928-29, 4,685; 1933-34, 7,972; compared with wheat acreage—1913-14, 3,943; 1918-19, 3,983; 1923-24, 3,728; 1928-29, 9,164; 1933-34, 8,679. But however valuable the sheep has proved as a source of income we must realise there are limits to the carrying capacity where natural grasses form the main feed. It will be agreed that during the spring and summer, between grass and stubble, there is usually enough sheep feed to keep the flocks in good condition, but in the late autumn and early winter there is a decided shortage in the supplies of paddock feed, and it is this annual shortage which plays such an important part in the carrying capacity of our farms. Is it possible to strengthen this weakness, and if so, in what way? In the first place it should be decided that the ultimate objective of any attempt to make good this shortage of feed must show a result for a direct financial gain over and above its actual cost if it is to be adopted. Also that if there is a risk about the method to be adopted being successful, then it must show a much bigger return than can be expected from natural feeding, or it should be rejected without further consideration. There are several avenues through which income may be derived from sheep, viz., wool, fat lambs, or fat wethers. But before this aspect is considered, the possibilities of providing the feed must be searched. In my opinion only two methods lend themselves to our purpose in Mangalo—sowing oats in the autumn or hand feeding from stored feed. In some respects sowing oats promises to serve well. Firstly we can produce the seed on the farm. It can be sown when the land is dry and when the team is more or less idle. Before this sown grain can be of use to the sheep rain must fall and fall early enough in the year to cause a good root system to become established, thus giving considerable growth and feeding off qualities before the cold of winter comes. Because of the expense of this work we must expect a longer grazing period than from natural grass. We know from experience that if oats do not get away before the middle of May their growth is slow, and in fact worthless to produce a bulk of early feed, and even if we use quick-growing varieties we are not helped much, because they will seldom stand feeding off. Since early rain is vital to this project, let us see what the prospects are. The only way to get at this is to gauge what has occurred in the past, and so I have drawn up a chart from the records at the Mangalo Post Office taken over a period of 18 years, showing the totals of rain for every 15 days during the months of March, April, May, and June. The net result shows an average of 41 points for March, 78 for April, 145 for May, and 166 for June. During the 18 years, in six years, or one-third of the time no rain fell during March, and in two other years the gaugings were under 20 points. In three years, or one-sixth of the time, no rain fell in April. Taking the chart all round, together with the number of days in which the rain fell, it would seem risky to attempt to get early feed by sowing oats. This conclusion also indicates that fat lambs cannot be raised successfully in Mangalo. We are told lambs must arrive early to catch the season; they must be fed on a great bulk of succulent feed, and it seems these ideals cannot be attained because of the absence of rain at the right time. Of course, oats could be sown early to chance early feed, and if it failed the oats would not deteriorate in the ground, and when the winter rains came they could be allowed to grow and mature, and the grain reaped and stored. In autumn this grain could be hand fed. But this type of feed will not produce fat lambs, and

my experience has been that it is far too expensive to produce wool. My conclusions are that Mangalo farmers must decide that this autumn shortage of feed cannot be substituted economically, and we must therefore be content with a less ambitious programme of carrying only such sheep as can be kept on the natural grass even though in some years some feed goes to waste. (Secretary, R. J. Turner.)

O'LOUGHLIN.

March 21st.—Attendance, 9.

HANDLING THE HORSE.—Mr. E. Lutz read the following paper:—"There are many ways of handling horses, of course, but I shall deal with young horses, that is to say, from a foal till broken into work. On ordinary farms all breeding mares have to take their places in the team, generally at harvest time, when the foal is about three months old. This is when I consider a foal should be handled first, as it has to be separated from its mother when she has to go to work. Most farms have a loose box, or small yard to shut the foal in but in some instances it is a very poor one, which soon teaches a foal to crawl, &c. Although done on very few farms, I am a firm believer in tying the foal up, where it cannot walk around. It will pull back for a start, but very soon will become used to it. This is when it should be petted and got quiet. Do not start to quieten it from the wrong end; when it is finished pulling back, put your right arm over its neck, and with your left, rub over its nose gently, slowly working up its face and over behind its ears. By doing this several times he will soon get used to you. When quiet about the head, gradually work back around his hind-quarters. Always bear in mind to keep close to him, not giving him a chance to kick you. After you have him quiet, so that he can be caught anywhere, catch him and you will find that you can lead him with the rope round his neck up to the post for tying.

When harvest is completed and the mare turned out, the foal should not be touched again until ready to break in. If petted too much he becomes sneaky and cunning. *Breaking in a Horse.*—I do not favour breaking in a horse at harvest time when a little over two years, as this is rather young, and with hot weather you are more likely to damage his shoulders. I favour the latter end of seeding, and then only short half-days. The previous handling of tying up when a foal now plays a great part, as he will be caught with very little trouble. Tie him up, and if quiet as before, put the winkers on and bit in, and leave him for a day or so, that he may become used to them, then take him out in the open and make him travel round, first one way and then the other. When you think he is sufficiently mouthed, have a pair of reins and drive him around, and at the same time teach him words of command. When this is satisfactory, you can put him in the team along with other quiet horses, and no trouble will be experienced. He is not likely to pull back, this having been taught him when tied up as a foal. Many ropes, couplings, winkers, &c., are saved by this method of handling; also there is no need for assistance when handling a horse in this way.. This I know from experience, as I never have assistance when breaking in my young horses." (Secretary, E. R. Pfeiffer.)

PINKAWILLINIE.

April 17th.—Attendance, 9.

Mr. W. Hutchins read the following paper entitled "Dry Pickling of Wheat":—"I propose to deal with the importance of seed wheat pickling as a preventive of diseases in wheat, such as takeall, flag smut, loose smut, and bunt. I wish to deal mainly with the advantages of dry pickling, but at first I will deal briefly with solution

or wet pickling. One of the disadvantages of pickling seed with solution is the fact that the germination is adversely affected, also the initial growth, and in many cases this has caused farmers to weaken the known effective strength of their solutions. Such a practice, whilst overcoming the disadvantages mentioned, has had the effect of increasing the bunt infection with proportionate loss, and in addition considerable inconvenience is caused by the fact that wet-pickled wheat must be sown immediately after treatment. It is claimed that both bluestone and formalin solutions lessen the vitality of the seed, and so pickling with these solutions must be done during seeding time, thus leading to waste of time or working late at night after a hard day's work.

Now, however, there is a method of pickling with a fungicide in dust form which has overcome these disadvantages, and which is more popular each year. The use of finely powdered copper carbonate cannot be too strongly recommended, for it does not affect the vitality or germination of the seed, nor does it delay germination or initial growth. Indeed, the germination appears to be improved by about 2 per cent., a result confirmed each year for a period of three years in tests in Victoria. Whilst many tests have been carried out to find the exact quantity of dust which should be used with every bushel of seed wheat, I feel that this is really a matter for further experiment by the user. Seed which is badly affected with bunt spores may require more dust than comparatively clean seed, but generally speaking 1¼ to 1½ozs. of dust containing not less than 50 per cent. of metallic copper is safe and effective. To ensure maximum yields pickling is essential, and the correct method must be adopted, otherwise the whole operation will be valueless.

In conclusion, I will briefly deal with the disease and how to detect it. A bunted head of wheat has a peculiar odour, not unlike that of rotten eggs. The grains at first sight appear to be intact, but closer inspection shows them to be replaced by spherical bodies called smut balls, containing a mass of black powdery dust enclosed in a tough skin. Each smut ball is capable of producing millions of seeds every year, any one of which may infect a wheat plant. It is most important that the grower should realise this fact, and since the smut seeds are carried to the crops on the wheat grain, any bunticide that will destroy them without injuring the wheat will result in a smut-free crop. (Secretary, L. F. Freeth.)

FARM BOOKKEEPING.

[By C. J. Whillas, Green Patch.]

Whilst not insisting that bookkeeping is necessary to successful farming, some simple system could be used to advantage, and from a practical standpoint it is well worth while. The keeping of financial records can be commended on the following grounds, viz., it shows the farmer how he stands financially with others at all times, and thus places him in a strong position in the settlement of any dispute; it places his affairs before him in terms of profit and loss, so that he is not working wholly in the dark; it enables him to compare one year's work with another, as well as the different activities of a farm; it enables taxation returns to be filled in without trouble.

Complicated cost accountancy such as is used in a large manufacturing concern is not applicable to the average farm. Operations are on too small a scale to warrant the cost. Farm operations overlap so much that correct apportionment of wages and stores would be difficult. Also, it is almost impossible to keep a correct account of many matters that influence the real profit and loss of many farm activities such as soil fertility, increase or decrease due to grazing, cropping, or top-dressing, &c. In fact, most farm activities are too complex for close recording both in regard to costs and returns.

It is, however, possible to keep simple account books that will prove quite useful to the average farmer. Before any farmer can attempt to keep his own books it is essential that he has a fair knowledge of the principles governing same. Therefore he should, unless he already has the knowledge, study the subject through textbooks or otherwise. Such a paper as this can only deal lightly with the subject. A few remarks on bookkeeping generally are necessary before touching farm bookkeeping specially. The objects of bookkeeping are: "To record

correctly in books, transactions involving the transfer of money or money's worth; firstly, in so explicit a manner that at any subsequent time the exact nature of such transaction can be readily perceived, and secondly, that such transactions shall be so classified that at any time the total results can be readily ascertained." If time and labour were of no object, bookkeeping would be fairly simple, but it is obvious that the cost of keeping accounts of any given business must not exceed the benefits derived therefrom. It is mainly the short cuts that make modern bookkeeping so complicated. In old-fashioned bookkeeping—and it is still the custom in many countries—there were only two books, viz., the journal and the ledger, the journal containing in chronological order a record of all and each transaction just as they occur, and the ledger a segregation and classification of these transactions under their correct headings. The sales and purchases book now used are only types of journals arranged for saving time and labour, and the cash book is only a ledger account kept separately for convenience. The terms "credited by" and "debited to" can easily be followed thus. Every entry is a transfer—one place or party is the giver and the other the receiver of whatever money or meney's worth is being transferred. The giver is always "credited by" and the receiver "debited to" the amount of the transfer. (In single entry only one side of the transaction is recorded, and results only show what one owes or what is owed.) Double entry records, both sides of all transactions, so that the farmer's affairs are recorded both externally and internally. Therefore by dividing one's affairs internally into so many convenient sections each transaction recorded in double entry books will show the other party Cr. by, and a section of your own affairs, whatever is being transferred, Dr. to, or *vice versa*. Double entry thus enables a tally to be kept of the financial position with others, to classify and analyse one's own affairs and as the total of all the debits equal the total of all the credits, the clerical accuracy of the work can be checked.

A complete system of double entry would not suit many farmers, as it would take too much time. Also farm work unsuits one for the careful and methodical entering and posting necessary. Good results can be obtained with much less bother. It is not possible to devise one short-cut bookkeeping system that will be suitable for every farmer, for conditions may differ greatly. I will try to outline a simple system that should suit many, the working conditions necessary being that the farmer shall square up all accounts, both in and out, at the end of the financial year, and that he shall pass all his money transactions through his bank account. In this case an analysis of the credits and debits shown in the bank account over the year, in conjunction with the increase or decrease shown in the balance-sheets at the start and the end of the year, will supply all the figures necessary to draw up profit and loss accounts of his different activities.

Under the conditions mentioned above the bank pass book can be taken as the starting point for his main books, and his payments—that is, cheques drawn—will be his expenditure and bank "pay-ins" his receipts. The question of squaring up at the end of the year may be out of the question, but of late years a farmer's credit is generally restricted to secured loans and his sales are mostly on a cash basis.

It is most important to look after sales and receipts. A simple way to do this is to use a rough day sales book—any book having a date column, a particulars, and a money column will do. Enter details of every sale as they occur, leaving sufficient space below each sale entry to enter when and how paid. Some farmers keep records of their daily money transactions in their working diary. This is not advisable, and it will save a lot of time and confusion if a separate book is kept for recording sales and receipts. As for his purchases, a file of unpaid and one of paid accounts should answer in most cases. For the more certain collection of the money due from his sales, other than spot cash sales, and for keeping records of money owing him, the farmer should at the end of each month, or more often if necessary, make out from his sales book duplicate invoices or statements of amounts owing to him, mailing the original to the debtor and keeping the copy as a record of the position.

We will now deal with the farmer's main account books. For these he will require a ledger and two cash analysis books. The ledger will be used only for end of the year statements, balance-sheets, bank or cash account, totals of year's receipts and payments, and profit and loss accounts. The most convenient form of ledger for these purposes will be one with journal ruling, *i.e.*, one having a double money column on each folio. The analysis books will be used, one for analysing the receipts and one for the payments. Analysis cash books contain a date column, a particulars column, then a number of money columns. They are standard stock and can be had up to thirty money columns. The number of money columns required will depend upon the number of sections required for the money transactions being analysed. The use of such books is known as tabular bookkeeping. Its use gives results that would require a tremendous amount of time and labour in posting, &c., under ordinary methods. In the case of the farmer's books the practice of using this system can be followed by studying the example below from an imaginary farmer's receipts analysis book. It will be noted that each receipt is first entered in the bank column, then cross-cast horizontally across the book and entered under its correct heading.

The farmer's financial year should coincide with the income tax year from July 1st to June 30th. The first step in starting a set of books is to draw up a balance-sheet of the position at the start of the year under review. Land values should be put in at cost, *i.e.*, the cost of the land plus improvements minus a depreciation of the improvements unless they are maintained in as good order as when constructed. If the land has to be put in at an estimated value put it a

little below current values. Plant can be put in at cost, less a yearly depreciation. For the careful farmer, 5 per cent. per annum should be ample for plant depreciation. Livestock put in at about market rates, but without much variation.

The undermentioned transactions are those of a farmer whose affairs are not very complicated—one who confines his activities to cropping cereal crops and sheep, and who does most of his own work. His working horses are part of his plant. Should a farmer have other activities the receipts and expenditure can be dealt with by having the necessary extra columns in the analysis books.

The affairs for the year ending June 30th, 1934, will show the following statements, viz., "Balance-sheet as on 30/6/33," "Balance-sheet as on 30/6/34." "Receipts analysis book" show the first few entries of the year, method of heading the analysis columns and of cross-casting the cash amounts. "Totals of payments analysis for the year" show the headings that will be used in the payment analysis book: "Totals of receipts and analysis for the year," "Bank account," "Crop account," and "Sheep account for the year; "Profit and loss account for the year," also a "Statement showing how the year's profit balances with the balance-sheet surpluses."

In the receipts analysis book the analysis columns are headed under three main headings, viz., Crop account, Sheep account, and Sundry account; then the Crop and Sheep accounts are still further subdivided into the definite products of each activity. The Sundry account is for any receipts that will not come under the other headings. With the receipts the choice of analysis headings is simple. But with the payments it is another matter. In fact, it requires a double analysis to give satisfactory results, first as regards the use made of the payment and second as regards the nature of the payment. The first analysis is required in order to arrive at the cost of the farmer's different activities, whereas the second is mainly for income tax purposes and to show the farmer how much he spends on various items. The payment analysis book will be used for the first analysis. The analysis columns will be headed *General account*, subdivided into household, private, car costs, interest, taxes, &c., and general expenses; *Crop account* subdivided into wages, supplies, repairs, and transport; *Sheep account* subdivided into sheep purchases, wages, supplies, repairs, and transport; *Property account* subdivided into wages and supplies; *Plant account* and *Sundry account*. The *General account* is necessary, as it would be very difficult to charge the items that will come under it direct to the other accounts. It is really an overhead account. At the end of the year the total expenditure shown in General account must be apportioned out to the other accounts. To fix the ratio that each other account will take is a matter of judgment dependent upon the labour put in and the use of the land for each activity. The farmer's own wage is included in the General account under the Private section and part of the Household section. The direct working cost accounts such as Crop account are subdivided into wages, for all labour used; supplies, repairs, for all accounts paid for any repairs on maintenance either for improvements or plant that can be considered due to that activity and transport payments for railage, freight, cartage, or any transport charges, on any supplies required for cropping, or for the transport of any products of cropping. *Sheep account* is split up in a similar way, with an extra column for sheep purchases. *Property account* is for the cost of the land and any improvements thereto, and is subdivided into wages and supplies. Maintenance of improvements should not be charged to this account, but should go direct to the working accounts. *Plant account* is only for new plant added. Maintenance and repairs must not be charged to this account, but to the working accounts.

In entering up the analysis book the farmer will take the entries direct from his passbook, starting from 1st July of each year. The Credit entries will be the receipts and the Dr. side the payments. Each item will be cross-cast and entered

under its correct analysis heading. At the end of the year, he will take the totals, which should, of course, check up with the bank totals. He will then take stock and draw up a balance-sheet for the end of the year. He is now in a position to draw up Profit and Loss accounts of his different activities on the lines shown in the example.

Regarding the second analysis of payments I mentioned above, this is not required for the Profit and Loss accounts, and is therefore not over important, but for income tax purposes it is necessary to segregate one's payments into a great number of sections—too many for a tabular cashbook. The simplest way to get at it is to make out lists on separate sheets of the cash amounts under as many headings as are found necessary. For Wages, every employee will require a separate list. Supplies—a separate list for every kind of item. Repairs will require at least the following: blacksmithing, saddlery, garage costs, plant parts, tractor parts, fencing material and building material. General expenses—stamps, telephone charges, insurances, rent, rates, taxes, bank charges, interest and travelling expenses, household and private expenses.

A statement in the ledger should then be made of the totals under each heading showing the results of the dissection of the payments in this way.

Balance-sheet on June 30th, 1933.

LIABILITIES.

	£	s.	d.
Bank overdraft on 30/6/33	1,508	10	3
Outstanding accounts .. .. .. nil.			
Surplus	4,749	9	9
	£6,258	0	0

ASSETS.

	£	s.	d.	£	s.	d.
Land—as per 30/6/32 valuation	4,568	0	0			
Plus year's improvements	210	0	0			
				4,778	0	0
Plant, 30/6/22—Valuation £606, plus year's increase £40, minus year's depreciation £31	—			615	0	0
Sheep—800 head at 12s. per head	—			480	0	0
Crop—Products on hand 30/6/33—						
Hay, 110 tons at £2	220	0	0			
Oats, 60 bags at 5s.	15	0	0			
				235	0	0
Land in crop—200 acres at cost 15s. per acre	—			150	0	0
				£6,258	0	0

Balance-sheet on June 30th, 1934.

LIABILITIES.

	£	s.	d.
Bank overdraft on 30/6/34	1,248	16	11
Outstanding accounts .. .. .. nil.			
Surplus	4,966	15	6
	£6,215	12	5

ASSETS.

	£	s.	d.	£	s.	d.
Land, as per 30/6/33 valuation	£4,778	0	0			
Plus year's improvements	34	12	5			
				4,812	12	5
Plant, 30/6/33—Value £615, plus year's additions £100, minus year's depreciation £35	—			680	0	0
Sheep—780 head at 12s. per head	—			468	0	0
Crop—Products on hand 30/6/34—						
Hay, 30 tons at £2 per ton	—			60	0	0
Land in crop—260 acres at cost 15s. per acre	—			195	0	0
				£6,215	12	5

Analysis of Receipts for the Year Ended June 30th, 1934.

Date.	Receipts.		Analysis.							
			Crop Account.				Sheep Account.			Sundry A/c.
	Particulars.	Bank.	Hay.	Wheat.	Barley.	Oats.	Sheep.	Wool.	Skins.	
1933.		£ s. d.	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.	
July 2	S— Meat Coy—20 wethers at 15s. per head	15 0 0	—	—	—	—	15 0 0	—	—	
July 4	J. Jones—26 bags barley at 6s. per bag ..	7 16 0	—	—	7 16 0	—	—	—	—	
July 5	T. Brown—2 tons chaff at £3 per ton	6 0 0	6 0 0		—	—	—	—	—	
July 8	X, Y & Co.—10 bales wool	120 2 8	—	—	—	—	—	120 2 8	—	
July 9	Federal Government—Wheat bounty	18 6 0	—	18 6 0	—	—	—	—	—	
July 12	X, Y & Co.—Sheepskins (12)	1 16 0	—	—	—	—	—	—	1 16 0	
July 14	T. Brown—10 tons hay at 40s. per ton....	20 0 0	20 0 0	—	—	—	—	—	—	

Totals of Payments Analysis for the Year Ended June 30th, 1934.

	£	s.	d.	£	s.	d.
General Account—						
Household	70	2	7			
Private	58	7	6			
Car costs	48	3	2			
Interest	82	10	4			
Taxes, rents and rates	14	3	8			
Other business expenses	3	7	4			
				276	14	7
Crop Account—						
Wages	50	0	0			
Supplies	32	1	6			
Repairs	28	4	2			
Transport	10	3	9			
				120	9	5
Sheep Account—						
Sheep purchases	20	0	0			
Wages	41	5	0			
Supplies	5	0	0			
Repairs	2	2	0			
Transport	8	0	0			
				76	7	0
Property Account—						
Wages	20	0	0			
Supplies	14	12	5			
				34	12	5
Plant Account	—			100	0	0
Sundry Account ..nil						
Total year's payments				£608	3	5

Totals of Receipts Analysis for the Year Ended June 30th, 1934.

	£	s.	d.	£	s.	d.
Crop Account—						
Hay—61 tons sold	130	0	0			
Wheat—2,100bush. sold	370	6	10			
Barley—177bush. sold	22	2	2			
				522	10	0
Sheep Account—Sheep sales—150 head sold	110	0	0			
Skins—36 sold	5	0	0			
Wool—20 bales sold	230	6	9			
				345	6	9
Total year's receipts				£867	16	9

Bank Account for the Year Ended June 30th, 1934.

Date		Dr. £	s.	d.	Cr. £	s.	d.
1933.							
July 1	Balance brought forward	—			1,508	10	3
1934.							
June 30	By Year's total payments from payments book	—			608	3	5
	To years total receipts from receipts book	867	16	9			
	Balance carried forward	1,248	16	11			
		£2,116	13	8	£2,116	13	8

Crop Account for the Year ended 30th June, 1934.

		Dr. £	s.	d.	Cr. £	s.	d.
By	Year's receipts	—			522	10	0
	Stocks on hand, 30th June, 1934	—			60	0	0
	Land in crop, 30th June, 1934	—			195	0	0
To	Year's payments crop account	120	9	5			
	Portion of year's payments general account at two-thirds of whole	184	10	0			
	Portion of plant depreciation, two-thirds of whole	23	6	8			
	Stocks on hand, 30th June, 1933	235	0	0			
	Land in crop, 30th June, 1933	150	0	0			
	Year's Profit	64	3	11			
		£777	10	0	£777	10	0

Sheep Account for the Year ended 30th June, 1934.

		£	s.	d.	£	s.	d.
By	Year's receipts	—			345	6	9
	Stocks on hand, 30th June, 1934	—			468	0	0
To	Year's payments sheep account	76	7	0			
	Portion of year's payments general account, one-third of whole	92	4	7			
	Portion of plant depreciation, one-third of whole	11	13	4			
	Stocks on hand, 30th June, 1933	480	0	0			
	Year's Profit	153	1	10			
		£813	6	9	£813	6	9

Profit and Loss Account for the Year ended 30th June, 1934.

					£	s.	d.	£	s.	d.
By	Total year's receipts				—			867	16	9
	Stocks on hand, 30th June, 1934—									
	Sheep	£468	0	0						
	Crop products	60	0	0						
	Land in crop	195	0	0						
					—			723	0	0
To	Year payments on revenue accounts—									
	General account	£276	14	7						
	Crop account	120	9	5						
	Sheep account	76	7	0						
					—			473	11	0
	Stocks on hand, 30th June, 1933—									
	Sheep	£480	0	0						
	Crop products	235	0	0						
	Land in crop	150	0	0						
					865	0	0			
	Plant depreciation	—			35	0	0			
	Profit				217	5	9			
					£1,590	16	9	£1,590	16	9

Statement showing Balance between Balance-sheet Surpluses and the Year's Profit.

	£	s.	d.	£	s.	d.
Surplus as shown on 30th June, 1934, balance-sheet	—			4,966	15	6
Surplus as shown on 30th June, 1933, balance-sheet	4,749	9	9			
Difference being year's profit	217	5	9			
	£4,966	15	6	£4,966	15	6

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kelly	1/6/35	19	Annual Meeting	F. R. Illman
Lipson	25/5/35	13	Address—H. D. Adams	M. Barraud
Koppio	17/4/35	18	Discussion	M. Gardner
Koppio	15/5/35	7	"Top-dressing"—J. Carter	M. Gardner
Maltee	13/6/35	11	"Dry Farming"—R. B. Edson	E. Schwarz
Laura Bay	11/6/35	12	"Management of Farm Horses"—A. M. Dixon	P. S. Morrison
Balumbah	18/6/35	14	Annual Meeting. "Tractor or Horses"—A. J. Swann	J. E. Swann
Warranboo	14/6/35	5	"Breeding Pigs and Lambs"—O. J. Murphy	H. F. Chilman
Goode	19/6/35	13	Discussion	B. A. Linke
Cungena	2/6/35	12	Annual Meeting	A. A. Voumard
Butler	25/6/35	11	Harvest Reports	C. F. Jericho
Wallala	12/6/35	5	Formal Business	C. F. Zipp[illegible]

EASTERN DISTRICT.

KANNI.

March 30th.—Attendance, 9.

QUESTION BOX.—Among the questions discussed was the query, "Does bluestone lose its strength if held for 12 months?" Mr. F. Hoad believed it would not be affected. "What is a good grass to sow for feed when natural grass has dried off?" Wimmera rye grass, native grass, and other species were recommended. The question of holding a local wheat crop competition was discussed. (Secretary, E. H. Schulze.)

SUTHERLANDS (Average annual rainfall, 10.84in.).

April 4th.—Attendance: 14.

SEEDING OPERATIONS.—The following paper was read by Mr. V. H. Weis:—"Since the beginning of the depression, and the relatively low prices for wheat, farmers have undertaken to sow large areas in order to meet the overhead expenses. Although the modern implements employed on the farm to-day make it possible to sow large areas, it certainly would be advantageous to the industry to reduce the acreage, and pay greater attention to the preparation of the soil and the sowing of the seed. It does not seem to be fully realised that the farmer who takes reasonable care to sow the seed on a well-tilled fallow naturally increases the chances of receiving a good yield per acre, whereas the farmer who makes it his policy to endeavour to scratch in every available acre surely reduces the chances of securing a good average yield. Nor does it seem to be realised that it is both simpler and cheaper to handle 1,000 bags of wheat produced on 250 acres than from 500 acres. It should be unnecessary to stress the fact that land should not be brought under wheat too often, and particularly the mallee areas, which should not be cropped with wheat more frequently than once in three or four years, and where the land is very light, at even greater intervals. Every farmer should have a definite crop rotation, because it not only increases the mean yield per acre, but also increases the stock-carrying capacity of the farm, and in these times of economic depression and the continuing low prices for produce, every farmer must endeavour to increase the mean yield per acre, and take from the land what it can actually produce, or, in other words, he must increase the production per unit. It must be realised that the best time to increase the mean yield of wheat per acre is the period preceding seeding time. Seeding in reality is the beginning of the next year's profit, and the successes depend largely upon the methods adopted.

THE BENEFITS OF FALLOW.

There is one practice which has enabled farmers to continue growing wheat in the unfavourable conditions, both economic and climatic, and that is the recognised practice of sowing wheat on land that has been treated as carefully tilled bare fallow. Fallow operations should in most cases be completed in the month of August, the soil being stirred to a moderate depth of from 2 to 4 inches, the main purpose being to conserve the moisture of the winter rains and stimulate weed germination. Those who delay fallowing operations because they are afraid of ploughing up the bits of feed that are about are usually doing so at the expense of the succeeding year's wheat crop. Whether the fallow should be harrowed immediately after ploughing or whether it should be left in a rough state until the rainy season has elapsed is a matter depending upon local weather conditions. It certainly is true that any attempt to reduce heavy soils to a fine tilth during the rainy season would result in compacting the soil, which would have the result of throwing off rather than allowing the moisture to penetrate into the ground.

Weed growth can effectively be controlled by cultivating, and at the same time creating a surface mulch. The number of tillage operations required will depend much upon the circumstances which prevail, but maintaining the surface mulch will permit any rains which fall during the summer months to sink into the soil readily instead of running off, or being held near the surface to be rapidly evaporated. Fallow soil normally contains more moisture at seeding time than stubble ploughed soil, but the difference is not so great as is generally supposed. An experiment has been carried out at the Waite Research Institute to ascertain the moisture contents of fallow and of stubble to a depth of 3ft. at normal seeding period. The result was that fallow contained 1.5 per cent. more moisture, which is equivalent to a little more than half an inch of rain. This appears to be of small importance compared with the serious lack of nitrates in the stubble-ploughed soil.

Although the precise chemical and physical changes which take place in the soil during the process of bare fallow are incompletely known, investigations have shown that fallow soil normally contains considerably more nitrate nitrogen at the end of the fallow period than at the beginning. Another important factor of the cultivated fallow is the preparation of a good seed-bed, which should consist of 1½ to 2ins. of loose soil mulch resting upon a firm, well consolidated sub-surface layer. It remains to be

added that the tillage of soils that are in a dust-dry condition should be avoided as much as possible, and particularly so if the soils are light in texture. Under those conditions it is usually beneficial to run sheep on the fallows to cope with weeds, and thereby help to consolidate the soil, and so create a firm seed-bed. As the result of the compacting of the seed-bed, either by cultivation or by sheep, the amount of moisture per unit volume is increased, with the result that the young roots can obtain the moisture more readily.

The Selection of Seed.

The production of pure seed wheat is a factor which does not receive the maximum amount of care on most of the farms in the grain-growing districts. It is commonly found that a variety contains as an admixture seed of all the common varieties that have been or are grown on the farm, varying, as they chiefly do, from early to late maturing, and it can be well imagined what results can be obtained from such wheat if chosen for seed. It remains to be added that the yield per acre will also be comparatively lower than would be the result from pure seed, because, as frequently happens, the strangers are of a low-yielding variety, or are the outcome of varieties that have never been adapted to the soil and climatic conditions of the district. Most strangers are introduced into a variety through the careless handling the seed receives on the farm. The neglect of cleaning out the drill when going on to another variety is one cause, or stripping two varieties of wheat on to the same floor, or grading wheat which has as an admixture a variety with large grains. The machine retains the large grains, and thereby increases the proportion of strangers. The presence of barley in wheat crops is also a matter which deserves attention, because in average years it will be noticed that barley has considerably more ears per plant than most varieties of wheat, and, if permitted to accumulate to such an extent, the wheat will become unfit for market. The only sure way of keeping a variety true to type is to grow the wheat in widely-spaced rows, and hand-pick all strangers, or hand-pick a certain area of the standing crop. These are the only ways whereby barley and other inferior matter can be completely eliminated, and the grower is then sure of the quality and trueness of the grain.

Suitable Varieties.—No amount of fertiliser and no system of cultivation or crop rotation will produce maximum yields unless the variety of wheat grown is well adapted to the soil and climate of the district. Wheat variety trials have demonstrated the wide differences in yield between varieties of wheat grown in the same district. One variety may yield well in comparison with a standard variety in one district and poorly in another district. For example, Gluyas, one of the highest yielding varieties in the low rainfall mallee areas, is at Roseworthy Agricultural College inferior to other and better adapted varieties. Whatsoever increase in yield is secured by using better varieties is obtained at no greater labour or monetary cost than is required to grow a poor yielding variety. Variety trials could be well conducted at each individual farm. By introducing a few new varieties each year the farmer could ascertain which is the most suitable variety, and in addition it would also stimulate interest in the value of varieties and in experimental work in general. Owing to the varying seasons it would be necessary to conduct these trials over a period of years, so that each variety is thoroughly tested The most suitable varieties to grow in the mallee areas are early maturing with a high yielding capacity. Such varieties would yield a high proportion of grain to straw, possess moderate tillering ability, and be resistant to prevalent diseases. For the more fertile districts the most suitable variety should be a mid-season to late maturing, with a high capacity.

Deterioration of Seed.

In the grain growing districts there appears to be a strongly held belief by some farmers that wheat which is grown continuously on the one farm leads to rapid deterioration of productivity, and if the variety is to be persisted with, it then becomes necessary to secure a change of seed. This is so highly regarded by some growers that they frequently change their seed, and always purchase seed to be used from outside sources. They maintain that by securing seed from a more fertile locality, where the yields have been much higher than in their own district, the wheat tends to be more vigorous and prolific, and must naturally under all circumstances substantially increase the yield of the crop. For that reason they would never think of using seed that has been grown on their own farm for a number of years, and would not even use seed grown in their own district.

Carefully conducted investigations have been carried out on this matter in many of the grain growing countries, and the result of this test proved that without a single exception the seed grown on the farm continuously gave greater results than seed of the same variety which had been secured from another locality. At Roseworthy College, Gluyas and King's Early have been grown continuously for over 30 years, and reports show that both varieties are more vigorous and prolific now than they have been at any time during that period. Where ordinary reasonable care is taken with seed, there is no necessity to secure a change, but it can be selected year after year from the same strain that has been grown continuously on the farm. If, however, seed is deteriorating to such an extent that it requires replacement of seed from another locality, it shows that ordinary care has not been taken with it and that the deterioration is the result of neglect and of the handling it receives on the farm, but it is not due to the continuous growing on the one farm.

Grading the Seed.

It will be noticed that wheat taken direct from the harvesting implement has much foreign matter associated with it, and will not run through the seed drill at the desired even pace. Bits of straw or even a mustard pod, will pass through the revolving wheels, be sucked into the seed cups, and place themselves in such a position as to prevent any grains from passing. The result is unsown rows where weeds make rapid growth.

The mustard seeds fall out of the pod, and are sown with the superphosphate, receiving encouragement for vigorous growth and spreading. It must also be remembered that these seeds do not necessarily germinate the year after they are shed, but may lie dormant for varying periods, and start into life among later crops.

It should be unnecessary to stress the fact that cracked and small or shrivelled grains are not successfully removed by the harvesting machine. Although these grains take their position when passing through the seed cups, very few if any ever germinate. If the germinating powers are poor then under average conditions it will produce comparatively weak plants, which have a very poor tillering capacity and naturally reduce the thickness of the crop and the number of ears per acre. In order that the seed wheat be free from all inferior matter it should be graded, or if a grader is not available the seed should be put through the hand winnower a second time, using the small zinc sieve. By keeping it level and fairly full of grain, most of the inferior matter can be floated off. Through grading the farmer assures himself of a good plump sample, which will run through the drill freely, and has a high and rapid power of germination and growth. It will produce strong plants with a high tillering capacity, and being large seeds it will give higher yields and also produce a larger proportion of large seeds than are produced from small seeds.

Pickling.

The world-wide importance of bunt or stinking smut as a factor detrimental to wheat production, and its great antiquity as a cereal disease, necessitates the treatment of seed wheat. Smut if not combated causes more loss to the Australian wheat farmer than any other fungus disease. If seed is not properly treated, this disease will affect up to 50 per cent. of the crop, and thus rob the farmer of half his profits.

The disease not only causes reduction of yield through the grain being displaced by spores, but the value of the grain generally for milling purposes is also materially affected. There are two distinct treatments available for the prevention of smut, viz., dry dusting with copper carbonate and wet pickling with bluestone (copper sulphate) or formalin.

Dry Pickling.

Dusting the wheat grains with copper carbonate powder at the rate of approximately 2ozs. per bushel has proved a comparatively satisfactory control for smut, provided the seed is not seriously affected. Through dusting the wheat with 2ozs. of copper carbonate per bushel, practically all the fine impalpable dust is taken up and held by the small brush at the end of each grain of wheat. Adequate provision should be made to sieve off any surplus powder that is not actually adhering to the grain. It is the free powder that causes most of the trouble in the drill, and it is advisable to give the drill a few turns with the handle to make sure everything is running smoothly. The dry pickling may be done at any time of the year and the wheat stored until required for seeding. It must be remembered when using dry pickle that a certain amount is liable to escape into the air where it remains suspended. To breathe this dust for a considerable period of time causes the throat to become dry and parched, and this may be followed by a certain amount of indisposition, therefore it is recommended that the farmer should pickle in the open and stand on the windward side of the machine.

Wet Pickling.

The use of bluestone as a pickle is obsolete in many districts, on account of the poor germination resulting from seed treated with this pickle. Where this wet method of combating smut is still used, the solution should be made by dissolving 1½lbs. of bluestone in 10galls. of water. Reinfection may take place immediately the solution is dry, as the pickle is only effective while wet.

If formalin is to be used care should be taken that a quarter per cent. solution is used, *i.e.*, 1lb. of formalin to 40galls. of water. Though formalin if correctly used does not hinder germination as much as bluestone, it has been proved that the seed should be sown within two days of pickling to secure the best results. When using wet pickles the pickling can be done by immersing the seed into the solution or by turning it with the shovel. It will be found that by immersing the seed, smut balls will rise to the surface and can easily be removed. Care should be taken to leave the seed in the solution for at least 3 minutes.

The Use of Artificial Fertilisers.

The use of artificial fertilisers plays an important part in increasing the productivity of cereal crops, and a proper system of manuring is only a profitable business proposition. To take out of the soil more than is returned to it must result in impoverishing the land sooner or later, and is equivalent to living on one's capital. In South Australia the two major soil deficiencies are water and phosphate, and, over a limited area, nitrates. If sufficient rain falls, then maximum yields can be obtained by applying phosphate, but on the other hand, if the rainfall and the phosphate content are sufficient and there is a deficiency in the nitrate content, then greater yields will be obtained by applying nitrogenous fertilisers. Manurial experiments carried out at the various experimental farms in the mallee areas, both in South Australia and Victoria, have proved that wheat sown with superphosphate showed a maked increase in yield over non-manured plots and continued to respond more liberally as the manurial dressings became heavier. The direct effect of the heavier dressings in promoting the growth of natural grasses in stubbles is also important, as it increases the stock-carrying capacity of the farm and the fertility of the soil.

It is generally recognised that 1cwt. of superphosphate supplies only sufficient phosphoric acid into the soil to produce what would be considered a fairly good wheat crop. A good dressing of manure is therefore essential to keep up the standard of fertility rather than let it diminish, and on poorer soils it is imperative in order to give the land an opportunity to produce a good crop. The advantage of sowing the superphosphate with the wheat becomes more marked as the season progresses, because it accelerates early growth and maturity, and lowers the water requirements for grain production. The increased yield obtained by applying soluble phosphates is mainly due to the increase in the number of ear-bearing tillers, since the number of

grains per head and the size of the grains are always identical in the produce from the manured and unmanured areas. Liberal dressings of superphosphate tend not only to give the maximum yields of wheat possible on the rainfall, but make it possible to secure the extra yield under ordinary conditions, with very little extra expense.

With regard to nitrogenous fertilisers, it must be remembered that the greatest returns will be received through applying it to stubble soil, as practically all the available nitrogen has been exhausted by the previous season's crop. Hence the nitrate nitrogen content is rarely sufficient to meet the requirements of a good cereal crop, and the application of nitrogenous fertilisers to the stubble-ploughed soil removes one important limiting factor.

SOWING THE SEED.

There can be no hard and fast rule laid down for the commencement of seeding, as this is entirely controlled by seasonal conditions. Experiments, however, have proved that the best period for seeding is after the autumn rainfall; the soil is then at its best, conditions are ideal, and by spring the crop will be far enough advanced to benefit from the warmer temperatures. Through the advancement of modern machinery it is possible to adjust the sowing dates to permit better germination of weeds, and these can then be effectively dealt with in the earlier stages. It also results in the production of crops with a better balance of grain to straw and enables greater production to be obtained on a given rainfall.

The advent of the combine has also shown a marked increase in the yields of cereal crops. The chief reason for the great success of the combine is that it cultivates the land more thoroughly and effectively than did the old-time cultivating implements, because the tines are spaced closer together, and if fitted with wide points, the cultivation actually overlaps, and it is therefore impossible to miss weeds and leave any soil untilled. Another important reason is that by more scientific sowing it actually increases the average yield. It is generally recognised that wheat, together with the fertiliser, should be sown on a level, compact subsurface, and covered wih a mulch of finely pulverized soil. Experiments that have been carried out on this matter prove that the moisture oozes by capillary attraction or surface tension to the surface of compaction, but that the dust mulch stops it from rising further, and so prevents loss of moisture by evaporation.

Although the depth of sowing has little effect on the root system of the plant, it is considered that to sow approximately 1½in. below the surface is satisfactory, and by placing the seed with the superphosphate on the compact subsurface it will derive the most benefits from the available moisture, which hastens germination of the seed, ensuring early growth and giving the crop every opportunity for healthy development in the early stages.

Amount of Seed per Acre.—The quantity of seed to be sown per acre is a matter which receives a great deal of discussion among some farmers, but it is a matter which naturally must be left to the farmer's own discretion. No farmer should be induced to sow more seed per acre just because his neighbour is doing so, but a wheatgrower should be convinced by no other theory than by experimenting over a period of years on his own land. Much, however, depends on the seasonal conditions which prevail, and it must be remembered that if the season is early, then less seed should be applied per acre than if the season is late. By applying an extra amount of seed per acre in late seasons, the grower practically assures himself of a thicker crop, because the wheat plant does not stool to such an extent as it does in more prolific years.

Harrowing.—Harrows give the farmer an implement which is light in draught, covers much width per stroke, and stirs the soil, which helps to conserve moisture. Harrowing after seeding is essential, but should not be proceeded with until four or five days after sowing, as this enables a further germination of weeds, which will be readily destroyed by a stroke with the harrows. After heavy rain the dust mulch tends to run together, and unless the mulch is renewed, much of the valuable moisture is lost. Harrowing after seeding will leave the surface smooth and even, and will ensure perfect covering of the seed and leave a workmanlike job. If the crop comes away strongly and tends to grow rankly, a stroke of the harrows will check growth and encourage stooling.

SPACING THE WHEAT PLANT.

Any observant wheatgrower who walks over his paddocks of wheat shortly after the seed has germinated must be impressed with the irregular spacings of the seed from an ordinary seeding implement. Although these machines are designed to space the grains as uniformly as possible, they are inefficient machines in this respect. It will be noticed by careful observation that there are spaces of approximately 12in. where not one grain of wheat has fallen, whereas on the next 12in. there will be more than a dozen plants. All this may be found in the same drill row. Although the wheat-

plant tillers more profusely at the wide spacings, it does not produce sufficient tillers to compensate for the shortage of plants. The annual yield would be greatly increased by using a seeding implement which spaced the grains more uniformly. Even with our present implements more even spacing could undoubtedly be obtained by keeping the feed cups and working parts clean and in good order.

CONCLUDING REMARKS.

The following analysis of the factors affecting seeding operations show that although considerable progress has been made, there is still a wide scope for further improvements to be made by the rising generation. I fully realise that you are already familiar with much that I have had to say, even with the least palatable portions of the address. But I would like to add that throughout the preparation of this address I have tried to keep steadily before me what seemed to be in the best interest of the industry and the grower.

The wheat Industry brings in more revenue to the State than any other product, and it appears likely to remain our principal product for a long time to come, and despite the speeches that have been thundered down upon the growers from public platforms to grow less wheat, our State wants not less but more wheat. It must also be borne in mind that unless those directly responsible for the growth of wheat work their holdings not only for private gain but for the requirements of the community as well, and furthermore that by reaping 6bushs. to the acre when it is both technical and economical for farmers to have produced 9bush. or 10bush., they are not only wronging those immediately dependent upon them, but also the community and the industry. Hence to be a successful wheatgrower the farmer must possess more than physical strength and an ability for manual labour, which were among the farmer's greatest assets in the days gone by, but in addition must have a knowledge of the principles of agriculture; he must know how and when to work his land, the variety of wheat most adapted to it, the fertiliser which ensures the best results, and the most suitable time to sow seed. These are the factors that eventually lead to growing better quality wheat and returning higher average yields. (Secretary, E. R. Schiller.)

PINNAROO (Average annual rainfall, 14.54in.).

12th April.—Attendance, 14.

HOW TO BREAK A COLT.—Paper read by Mr. C. H. B. Ross:—"To break an unbroken colt, have a good yard, and a good strong rope about 40ft. long with a loop about 2ft. 8in. long. This long loop is advisable as it gives a double rope round the horse's neck instead of a single rope where the short loop is used; it also prevents the horse from choking, as the end of the long loop will not pull over the knot tied in same. Have a stick about 10 or 12ft. long, bamboo preferred for its lightness and less danger of injuring the horse. Drive the horse into a corner and pat him with the stick till he gets used to you, all the time watching the horse's eye, patting the horse all over his body and head. When the horse allows the stick to be put over his head without taking much notice, put the loop of rope over the end of the stick, allowing enough rope to make a large enough sling to slip easily over the horse's head. When the sling has been secured over the horse's head, see that it is well up on the head with the knot of the loop well under his throat. Have your assistant take the end of the rope round a strong post about 18in. above ground. This height will give less strain on your post, and also help to prevent the rope from getting between the horse's ears,

which is dangerous. Have the horse fairly close to the post, say about 6ft. Have your man hold the other end of the rope by taking it around another post, making it easy for him to hold as the horse is pulling against him. By no means tie the rope until the horse has had a few good pulls. After the horse has stopped straining on the rope, approach him from the left, about level with his shoulder, with your hand extended, watching his eye all the time; pat him, talk to him coaxingly and give him to understand that you are his friend. Get a leather headstall without a bit. Undo the noseband, also unbuckle headstrap. Approach the horse with the headstall in your extended hand and let the horse feel the headstall with his nose. Slip the headstrap over his head, rubbing him with your hand gently all the time. Buckle the headstrap. Do the same with the nosestrap. Now get the bit, slip your hand under his chin, buckle the bit on the off side first, grab the bitstrap on the nearside, press your thumb against his gum, and slip the bit into his mouth and buckle up. Get a light strap; the hames-strap of buggy harness will do. Slip the strap into off side of bit ring, pass under chin to bit ring on near side and buckle so as just to allow the bit to play freely in the horse's mouth. This is to prevent the horse pulling bit ring into his mouth; also it is easier for the man on the end of the reins when the horse is untied. The horse is now fully haltered. Put a good rein on the rear bit ring. Let your man slacken the tie-rope, gently slacken the loop and take it off the horse's head. Now let the horse move around in the yard with the rein on his near side. Let him feel the rein gently at first, then make him move around in a circle to the left. Approach him, pat him, show him that you are his friend, but be firm with him, also give him to understand that you are his master. When the horse reins fairly well to the near side, put the rein on off-side bit-ring, and make him circle around to the off-side for a while. Then put a rein on each side and make him stop and start to your command. This should be enough for the colt's first lesson. Tie him up to a strong post at the manger with a bowline knot, so that it may be untied without trouble. When you think that your horse is sufficiently trained to be put into the team, put him on the near side. Have a quiet horse next to him with a light rope doubly tied in a small loop just below the horse's hame hook. Put a rope halter over the colt's leather headstall, and tie it into the loop of the hames of the horse next to him, just long enough to prevent the colt pulling on the rope halter when coupled up. When you have the colt fully harnessed, keep a spare rein on him for the first round or two, but being tied to the other horses' hames the colt has very little chance of getting away. I favour putting the colt on the near side of the team. If anything goes wrong you can get to him; all buckles are on the near side, and he has not the chance of loafing by letting his end of the swing rest against the double swing, which he has if put in the middle of the team.

To be a good horseman one must be fearless, be a lover of horses, and have unlimited patience. Use the open headstall for breaking young horses. I condemn the winkers altogether until the horse has worked for a time. If you happen to get a bad one to break, or a kicker, tie up the near front leg by putting a loop around his fetlock. Pass the rope over his withers and pull it through under his girth. Lift his leg by pulling up, and let your assistant take up the slack of the rope. Pass it over the body again and under his girth, and you have him at your mercy. Let him caper around the yard on three legs. Keep pulling his head to the left, or else the rope over his withers will work back over his body. Let him kneel and struggle until he is fully exhausted. Trim his tail and feet while you have him tied and you will find that you have full control over him without the horse doing himself any harm." (Secretary, H. L. Badman.)

Other Reports Receivec

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Coomandook ...	31/5/35	9	Discussion	W. R. Trestrail
Coonalpyn	12/6/35	19	Annual Meeting (Social)..	C. C. George
Lameroo	10/6/35	11	"Toxaemia in Sheep"—R. Jenkins	A. G. Potter
Taplan	6/6/35	8	Address—C. A. Goddard	P. R. Hodge
Chapman's Bore	17/6/35	18	Address—R. L. Griffiths .	J. P. Krollig
Pinnaroo	7/6/35	20	"Australian Banking"—A. H. Pitman	H. L. Badman

SOUTH AND HILLS DISTRICT.

FRAYVILLE.

At the monthly meeting held on 13th June a paper on "Pigs as a Sideline" was read by Mr. O. Rosenzweig:—"I intend to first deal with types of pigs, and, secondly, with their feeding. It is not intended to discuss all breeds of pigs, but it would be an advantage to the industry if many of the breeds were wiped out. This would enable a more uniform type to be produced and help gain the confidence of the overseas buyer. This is most important, as the Abattoirs requirements are, roughly, 1,000 pigs a week, so that when this is exceeded, as it has been during the last couple of years, breeders must produce what the overseas buyer wants and insists on. The pigs must be of even type and correct shape, and they must be given such food as will make them capable of producing the kind of bacon that the consumer desires.

The breeding of pigs of the type in demand is the most important factor, and that means the difference between profit and loss. At present the buyer of bacon pigs is looking for a pig with a long, deep middle, light shoulders, and good hams, the first in importance being the middle. The hair and skin give a fair indication of the firmness and quality of the flesh. The pig with coarse hair and wrinkly skin will probably yield coarse, dark flesh. Hairless skin usually denotes too much lard. The pig should not taper from shoulder to hams. It should be as wide there, and preferably wider than at the shoulder. White pigs are preferred. The breed recognised all over the world as the best bacon producer is the Large White.

Methods of Keeping Pigs.

There are two methods of keeping pigs—in the sty and in the open air. I should certainly recommend the latter method. Not only is there a saving in labour, but the pigs must be healthier. For the open-air method of keeping pigs it is necessary to have proper paddocks. I have a paddock and recommend a barbed wire fence which is about 44in. in height and consists of nine wires. In the long run it is the cheapest. Put your posts 12ft. apart; bore an inch hole 3in. from the bottom, then 3½, 3½, 4, 4, 4, 5, 5, 6, and 6in. This is an extra good fence. You can fasten in crimped droppers as you require. I have only one in the middle, and I should say that is all it requires, as pigs will not go near such a fence.

Feeding.

Barley comes first among the grains as a food for producing first-class pork or bacon, and, in conjunction with skim milk, forms an ideal food. Wheat as a food gives fair results. Feeding trials I have carried out with wheat and barley mixed show that pigs make quicker gains. When killed and dressed and allowed to set, the pigs fed on the wheat and barley mixture show a firmer fat than those fed on wheat alone. A crusher is the thing in which to prepare the food in a man's spare time. Mix wheat and barley, and then grind. When a pig attains the weight required by the curer, and is in good condition, it should be marketed, even though the market is dull. It is a mistake to wait for prices to rise. A pig may lessen in value, for there is no sale for over-fat bacon.

In these times of depression pig raising is a valuable sideline. Regarding low prices for grain, these last few years back we have had a fair amount of wheat under f.a.q. Three years ago I had 69 bags of wheat weighing from 150lbs. to 160lbs. a bag. There was no sale for it, so I bought 18 little pigs at 1s. 6d. each and 12 at 2s. 6d. (a total cost of £2 17s.). I fed them the 69 bags of wheat and 60 cases of apples, topped them off with 15 bags of crushed barley, and took them to the Abattoirs, receiving £83 9s. 7d. On top of that I had two pigs to kill for myself. In such ways as this the pig is able to convert into profit many products that would otherwise be wasted.

And, for the export trade in particular, the Large White or the Large White crossed with the Mid-York sow. Export buyers prefer the white breeds because of the better colour and conformation of the dressed carcass.

To make pig raising fully profitable it is essential to breed or buy the right type of pigs." (Secretary, H. H. Ramm.)

The Farm Horse.—The following paper was read by Mr. W. Faehrman at a recent meeting:—

To maintain the strength of his team the farmer naturally has to either buy additional horses or breed from his own mares. The latter is by far the most satisfactory, not only because of the high price which is now being paid, but because a purchase made at a sale ring is very often disappointing. Therefore I will first deal with the breeding of farm horses.

Unfortunately in the past there has been a tendency on the part of farmers to breed from any class of horse that would produce a foal, and the result is that quite a number of horses seen on farms to-day cannot be classed as a suitable type of farm horse.

The most popular type for farm purposes to-day is the Clydesdale, and for general all-round farm work can be recommended as capable of doing any job on the farm. The point to be emphasized as far as breeding is concerned is to secure the service of the very best sire available in the district. He should be of a square build, short but not flat ribbed, flat boned, sound on all legs, and, if possible, staunch and quiet. If possible choose a pedigreed horse—this is a guarantee that his breeding is good. Failing that, he should have a certificate of soundness.

Selecting a Sire.

Too much care cannot be exercised in selecting a sire, and bad points should not be overlooked, because the offspring are likely to have the same faults as the parents. It pays to breed good stock. A few of the reasons are:—A ready sale, attractive appearance, good and reliable workers.

There are several important matters which should not be overlooked to ensure a suitable mare becoming a successful breeder. A mare should be mated for breeding purposes at an early age—I should say from three to four years of age.

In many instances a mare, unless bred from when young, proves very unreliable as she grows older. An overfat mare is not usually a good breeder. If a mare has been worked down at seeding or fallowing time and has a worn-out appearance, it is wise to let her rest until later in the spring and then mate. If at all possible try to mate a mare on her first period after foaling; this is usually on the ninth day. A mare during in-foal period may be worked at almost any farm work right up to within a fortnight of foaling with benefit to the mare, as it will keep her from becoming overfat, but she should be so placed in the team that enables her to do her work without jerking. Avoid squeezing and crushing when driving through gates. Never use short swings which will allow the chains to rub the abdomen. A week before foaling it is advisable to separate mares from other horses. When the time of foaling is due I do not consider it advisable to put the mare in the stable and keep a constant watch, as this often disturbs and excites her. It is better to keep her in a small paddock and watch her from some distance. If any sign of difficulty is shown, immediately summon somebody competent, because a little assistance at the critical moment may mean the life of both the mare and the foal. Perhaps the greatest and most serious trouble the horse-breeder has to contend with is retention of the after-birth. In such cases a veterinary officer should be summoned immediately. I have read that three times as many horses die from this as from all other complications of foaling.

If a mare is required to work during the time she is suckling a foal this can be done after the foal is eight weeks old, but the mare should not be separated from the foal more than three or four hours. It is not advisable to allow a foal to follow the team, as it will probably prove a nuisance and is likely to be injured. Never allow a foal to suck when the mare is heated, as this may cause the death of the foal. A foal should be weaned at from four to six months old. It should be shut up in a yard with free access to water and be fed regularly on good nourishing food. Bear in mind that feeding is half the breeding. At 2½ to 3 years old a colt is ready for breaking in. When breaking in young horses always be kind and gentle, yet firm, never losing patience.

Feeding.

Feeding is one of the most important items of horse management, and the farmer must use his own discretion to a great extent. The manger should never be filled and then left till empty before being refilled. Each horse should receive just as much feed as he will reasonably clean up. Under natural conditions the horse is a bulky feeder, and under working conditions bulk is essential to his feed, and even where concentrated feeding is resorted to, the admixture of chaff prevents over hasty feeding and promotes digestion.

The stomach of a horse is small, and severe labour cannot be carried out on a full stomach, therefore feed should be small and concentrated. Oats, whole or crushed, rank as one of the best grains for horses. Always water the horses before feeding as well as after. It will not hurt him at all if he is used to it, even if he is hot. The walk in from the paddock will in most cases have cooled him down sufficiently.

To prevent sore shoulders never forget to groom down severely, as this is as necessary as a well-fitting collar. Keep all collars clean by scraping off any sweat and dust which may have accumulated. I prefer the short hames. The long hames tend to spoil the collar by pushing it out of shape and pinching the top of the horse's neck.

If it is not cold and rainy we have found it to advantage to turn horses loose at night, leaving the stable doors open and then feeding with hay in a shed a little distance from home. This enables them to roll and rub themselves, also making the

strawing of the stable unnecessary. When hitching up see that trace chains are both the same length, swings the right width, and there will be little trouble with sore shoulders.

When horses have been turned out for some time they should be worked short hours for a few days. Never work late at night, but start early and knock off early at night. Give the horses a short spell every round to allow to cool down a little. Do not expect eight horses to do the work of ten. An old saying has it, "the horse is the farmer's best friend."

The farmer, who should be a lover of horses, should not send his old horses to the sale, but should shoot them. This certainly is the most humane ending for these old and noble servants.

MILANG.

At a meeting held on 15th June, Mr. B. Casley read a paper entitled "Farm Conveniences," in the course of which he said that the rearrangement of fencing would often add to returns by reducing labour where cows were the main concern. Fencing could be erected in such a way that the rotational grazing of an area could be properly carried out, while labour was reduced to a minimum. The size of the paddocks must be governed by the fertility of the soil or by the nature of the farming operations. Adequate water supplies for stock had an important bearing on successful grazing. Cemented brick tanks and troughs were recommended because of their resistance to saline water. Tanks and troughs were easily and cheaply made. A trough to hold 600galls. had cost only £5 18s. Suitable yards should be made for handling and loading calves, lambs, or pigs. A permanent race should be built for loading calves; it was advisable to make it strong and broad enough to carry cows. For the repair and upkeep of implements a suitable set of tools should be kept. A large saving in repairs, &c., could be made if suitable tools were available. A suitable makeshift for a forge blower could be made from an old separator by soldering 3 or 4 wings to the bottom of the bowl and guiding the draught to the fire by means of a funnel. The part which went under the fire should be of piping with the end plugged and holes bored in suitable places. A soldering outfit and some carpenter's tools would be very useful. A very good job could be made of dehorning a young calf, say 2 months old, by cutting off the bud with a ¾in. chisel and afterwards searing with a red hot iron. A rope-maker was a handy tool. Mr. Casley made all his own rope from sheaf bands. He also described a method of making a ditcher from 2 railway sleepers, which would make a drain 15-18in. deep and would cover half a mile a day if 4 or more horses were used. (Secretary, L. E. Yelland.)

TWEEDVALE (Average annual rainfall, 35.97in.).

May 16th.—Attendance, 18.

Vegetable Culture.—Mr. H. Schapel, in his paper on the above-mentioned subject, pointed out that in the first place all seeds should be true to type, ground should be well dressed with stable manure in preference to other manures, and should be watered before the seeding, as watering after the seed was sown would harden the ground. In preparing land for a crop the ground should be well worked, ploughing in plenty of grass, and cultivating twice before planting. Onions should be planted 10in. x 3in. apart, the ground being kept loose after planting. Cauliflowers should be planted 2ft. 6in. x 2ft. and watered every other day, and they should be ready to cut in 8 to 10 weeks if manured with super and bonedust. Swedes should be grown on new ground. They did well on land which was not very fertile, such as gravel or stoney land. Turnips would grow almost anywhere. Carrots needed deep soil. The ground should be manured with artificial manure the year previous to cropping with carrots. Lettuce should be planted 10in. x 6in.-8in., using stable manure or sulphate of ammonia. Plenty of water is required in order to make them crisp. Beetroot, Egyptian Turnip Rooted was the best variety.

Times for Planting.—Cauliflowers and cabbages in November to February for winter crops; onions, April was the best time to sow the seed and transplanting should be done in August and September; carrots, September and October; lettuce, in the spring; turnips and swedes, October to February; garden peas, September to February, every two or three weeks; beetroot, any time of the year. One thing which gardeners should not overlook was to plough land two furrows deep, as that would bring down the weeds, and they would not give much trouble. (Secretary, B. Schapel.)

MOUNT COMPASS.

The annual meeting was held on 6th June, when there was an attendance of 170, including members and their friends, representatives of neighbouring branches, and Departmental Officers. The Chairman (Mr. A. S. Kidman) said that 11 meetings had been held during the year, with a total attendance of 590, or an average of 53. Field Days accounted for 5 meetings, and 7 meetings were held in the ordinary way. The subjects treated by Departmental Officers, members, and visitors in addresses and demonstrations were "Tobacco Growing," "Station Life," "Side Lines," "Visits to Eastern States and New Zealand," "Handling and Classing of Wool," "Sheep Shearing," "Pig Breeding and Management," "Progress of Jersey Herds," "Pastures Suitable to the District," "Manures and Manuring," "Potato Growing," "Field Trials of Implements for Swamp Lands," "Soils and Clearing Land for Pasture Establishment". A visit had been made to Roseworthy College, and several members had visited Branches in the district, and other Branches had visited Mount Compass. Successful competitions had been conducted for girls (flower growing), and for boys (potato growing). Other activities of the Branch included the recognition of the district as a meteorological station, the establishment of a daily mail service, assistance to officers in the collection of information on potato diseases, supervision of grass plots, and instruction to school boys on grass cultivation and potato culture. Arrangements were being made to hold a senior potato competition. In the State Meadow Hay Competition—open to all comers—Mount Compass members secured first, second, and third places. At the Royal Show, cows and sheep from the district obtained numerous prizes, including two champions. The lambs which secured first prize in the export lamb competition were bred in the district and on many occasions during the year, consignments of sheep and lambs from Mount Compass topped the Adelaide market.

The prizes won by Miss Betty Jacobs and Don McKinley respectively, in the flower and potato competitions were presented during the evening, and a musical programme was supplied by visitors from Victor Harbour. Mr. H. Womersley, Entomologist at the Adelaide Museum, gave an instructive address, illustrated by lantern slides, on "Biological Control of Insect Pests".

In thanking the Committee for the support of its members during the year, Mr. Kidman paid a special tribute to the excellent work of the Secretary (Mr. Chas. E. Verco).

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Hope Forest ...	3/6/35	20	"Co-operative Marketing" Mr. Filmer	E. C. Muldoon
Longwood......	18/5/35	10	Annual Meeting	H. G. Haines
Inman Valley...	23/5/35	9	Exhibit of Farm Inventions	A. M. Fuller
Monarto South .	15/6/35	27	"Primary Produce Prices" J. Schofield	C. F. Altmann
Blackheath	20/6/35	8	Discussion—"Victorian Wheats	E. H. Paech
Hartley	19/6/35	13	Annual Social	W. J. Brook
Frayville	13/6/35	12	"Pig-Raising"—O. E. Rosenzweig	H. H. Ramm
Monarto South .	18/5/35	24	"Smut and its Prevention"—C. D. White ..	C. F. Altmann
Yundi	19/6/35	9	"Motor Car Construction"—M. Lomax; "Points of Jersey Cow"—T. R. Smart	T. R. Smart
Inman Valley ..	20/6/35	25	Addresses—H. B. Barlow and P. Jeffrey	A. M. Fuller
Springton	5/6/35	21	Address—H. B. Barlow .	E. Brokate
Lenswood and Forest Range	26/6/35	25	Annual Meeting	B. F. Lawrance

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

LAURA BAY.

Meeting held June 11th. Attendance, 10.

WHAT CAN WE MAKE OUT OF YEAST DOUGH?—Paper by Mrs. A. J. Bowell:—"There are lots of ways of using up yeast dough if you have a little over after you have put the dough into tins for bread. You can make a nice little yeast cake by adding a little butter, sugar, currants, or sultanas, and a little nutmeg to flavour. Put these ingredients in according to the size of the cake; this will be ready to bake when the bread comes out of the oven. This cake is nice while it is fresh.

Baked Apple Dumplings.—Some morning when you are baking bread, save a small piece of dough when you are putting it in the tins. Put aside until you are ready to cook it, perhaps for tea. Then take the dough, and roll out and spread it two or three times with some nice dripping. Have some apples peeled and cored, or you can leave them whole, with cores out. Then roll out the dough pastry, and cut in sizes required for apples; wrap around apples, putting a little sugar and cloves with the apples. Put the dumplings into a piedish or a deep cake-tin. Then take 2 tablespoons of sugar, 1 tablespoon of butter, ¾ cup of boiling water, and pour over the dumplings, and bake for 1 hour until a nice brown.

This dough pastry is nice over fruit pies, or for tarts, but should be eaten while hot and freshly made. Just the plain dough is nice, dropped in small lumps into the stewpot. It is nice and light. Or you can leave a piece of dough on a plate, and just before dinner slide it off the plate into some boiling water, and there you have a dumpling, and you can serve it up with golden syrup and cream. Alternatively you may have it with meat and gravy. It can also be put over the top of any meat and gravy that is cooking in the saucepan for dinner." (Secretary, Mrs. W. Burke.)

MILLICENT (Average annual rainfall, 29.76in.).

The meeting held on 21st June was attended by nine members, the subject being "Favourite Winter Dishes." Mrs. W. Varcoe, Mrs. Bryant, Misses I. Fensom and K. Hutchinson submitted the following recipes:—

Mock Fish.—Beat 1 egg, grate 1 large potato into egg, add pepper and salt, and fry in spoonsful to a golden brown.

Salmon Dainties.—Take 1lb. salmon, 1lb. boiled mashed potatoes, a little chopped parsley, 1 teaspoonful mustard, a little vinegar, a beaten egg, a few breadcrumbs (if necessary), a little flour, fat for frying. Turn out the salmon into a basin, pouring off the liquid into a cup. Add the potatoes to the salmon, and mix well until the mixture is stiff; if too moist, add some breadcrumbs to absorb the moisture. Divide into 12 pieces and sprinkle with flour, make into round balls, and fry in plenty of fat until a golden brown. Add the teaspoon of mustard to the liquid from the salmon; then mix with a little chopped parsley the beaten egg and the vinegar. Stir over fire until thick. Pour the sauce over the salmon cakes and serve.

Treacle Pudding.—Half cup sugar, ½ cup dripping, 1 large tablespoon of treacle. Mix all well together, or dripping and treacle may be rubbed into flour instead. Add rather more than ½ cup milk, then 2 cups flour sifted with 1 teaspoon of soda, and a good dessertspoon of ginger. Steam 2 hours.

Gem Pudding.—Six tablespoons flour, 2 tablespoons sugar, 1 small tablespoonful cinnamon, 1 small teaspoon of soda, a pinch of salt, a piece of dripping the size of an egg. Mix all together with a little milk, then add 2 teaspoons of jam. Boil 2½ hours.

Scotch Broth.—¼lb. pearl barley, ¼lb. split peas, soak overnight. Place ½lb. best neck of mutton in a roomy saucepan, cover with cold water, add a level tablespoon salt. Simmer for 1 hour. Take 2 or 3 leeks or a small onion, 2 carrots, white turnip, and a small tender cabbage, chop up finely, and add to broth. Boil 1 hour. Quarter of an hour before serving add 1 handful of finely chopped parsley and 1 grated carrot.

Potato Pie.—Cut 2 large rashers of bacon finely. Peel and slice thinly 3 or 4 potatoes, also cut one onion into very small pieces or thin slices. Sprinkle some of the bacon in the bottom of a piedish. Add alternate rows of potato, onion, and bacon. Add salt and pepper dissolved in 1 tablespoon of boiling water. Cover with a good short pastry crust and bake quickly for 10 minutes, then slowly for almost an hour. Before serving add 1 cup milk or cream. Serve hot.

Breakfast Dish.—Cut up 2 large onions and boil in 1 cup of water. When cooked add 1 pint of milk; season with salt and pepper. When boiling, thicken with 2 heaped tablespoons of flour and 1 heaped tablespoon of "Oysterene" mixed into a thin paste with a little milk. Serve hot on slices of buttered toast.

Meat Pudding.—Of course, steak and kidney make the nicest meat pudding, but I often use any meat I have on hand, such as part of a leg of mutton, or any beef without bone or fat. Over the meat place a layer of onions and sprinkle with salt, pepper, flour, and thyme. Repeat until the basin is nicely filled, then 3 parts fill the basin with water. Make a crust with flour, suet, a little rising, and salt. Place on top and tie a cloth over. Steam for not less than 3 hours.

Date Pudding.—Take 2 cups of flour and sift with 1 teaspoon of carb. soda; add ½ cup sugar, 1 cup chopped dates (or any other fruit will do), 2 tablespoons of butter dissolved in ¾ cup of boiling water, and lemon to taste. Mix well and boil in a cloth for 2 hours. (Secretary, Mrs. H. J. Hutchesson.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).
Meeting held on 15th June. Attendance, 19.

DRIED FRUIT AND VARIOUS WAYS OF USING SAME was the subject of the following paper by Mrs. F. W. Liebelt.—"Australian fruits are dried under ideal conditions in full sunshine, and consequently retain most of their original flavour. Jams and chutneys made from dried fruits can be excellent additions to the larder It needs little more than the re-absorption of water to restore dried fruit to its original form. Here, then, are some recipes, both for jam and chutney, that I have chosen. They will doubtless appeal to women who, through rush of work, or perhaps sickness, have missed making any particular preserve earlier in the season. Apricots are cheap and make a very nice jam that is often considered better in flavour than that made with fresh fruit. Apricot jam is made as follows:—1lb. of dried apricots, 3 pints cold water, 3lbs. sugar, and a few almond kernels (if liked). Wash the fruit and then steep in the water for 24 hours or until fruit is plump and soft. Then pour into the preserving pan the liquid and fruit and bring to boil and boil for half an hour, stirring from time to time. Next add sugar and blanched almond kernels and bring to the boil again; boil for 20-30 minutes, or until a little will set when tested on a cold plate. Bottle and seal down at once. This jam sticks quickly, so stir almost constantly.

Peach jam is very nice and quite inexpensive if made with dried fruit. Take 1lb. of dried peaches, 4 pints of water, 3lbs. of sugar, juice of 2 lemons, 1oz. or 2ozs. of blanched almonds. You may, of course, omit the almonds, but if you have no lemons, substitute ¼ teaspoon (level) of citric or tartaric acid, otherwise the jam is inclined to taste insipid. Wash the peaches, cut them into three or four pieces, and soak overnight in water. Next morning rub off some of the skins and boil in the steeping water 20-30 minutes. Now add the sugar, the lemon juice (or acid) and the almond kernels, and boil briskly for another half hour, or until a little will set when tested. Bottle

and seal at once. Then there is an easily made apricot chutney that is very nice. Take 1lb. dried apricots, enough water to cover, 1lb. brown sugar (or more if liked), 2 teaspoons salt, 2ozs. whole ginger, ¼ teaspoon cayenne pepper, ¼ teaspoon cinnamon, 2 pints vinegar. Soak apricots in water overnight or until soft. Cook in the same water next day until almost mashed; add all the other ingredients (the ginger in a muslin bag) and simmer gently for about 1 hour, or until of the right chutney consistency. Botle, cork, and seal down. These, of course, are only a few ways in which dried fruits can be used to fill an empty larder. Once the idea is grasped many more people will use dried fruits where fresh fruit is out of the question.'' (Secretary, Mrs. F. W. Liebelt.)

O'LOUGHLIN.

Meeting held June 13th, 1935. Attendance, 11.

A MEATLESS MEAL.—Mrs. S. Trewartha read the following paper:—It is often a woman's worry as to what to prepare for the next meal when there is no meat in the house, for this often occurs in the summer months. This problem is perhaps not so great on a farm and with plenty of eggs, potatoes, and onions on hand. I am always pleased when some of my friends tell of how to do up a meatless meal, but it needs to be substantial, and, therefore, strength-giving for the men on the land. I have now jotted down some recipes that I have found appetising when one has to prepare such a meal. *Egg and Onion.*—Take 8 large onions and after peeling them, slice and fry in a little butter until a nice brown. Beat 6 eggs, to which add a cup of milk, also pepper and salt to taste. Then pour over the onions and stir over the fire until the eggs are cooked, as when scrambling them. *Potato Patties.*—One can also add beaten eggs and milk to mashed potatoes. Make this into a batter consistency and fry in the same way as the above recipe. *Potatoes and Eggs.*—After preparing potatoes for cooking, slice them on a vegetable slicer. Beat eggs and add to the sliced potatoes. Flavour with pepper and salt. Drop spoonfuls into boiling fat and fry. Other somewhat similar dishes are curried eggs, macaroni cheese, mashed potatoes and lettuce salad, and the usual fried eggs on toast or fried bread. (Secretary, Mrs. J. S. Foggo, *pro tem.*)

WEPOWIE (Average annual rainfall, 12.46in.).

A recipe afternoon was conducted at the meeting held on 19th June, 12 members being present. The following were among the recipes submitted:—

EGGLESS AND BUTTERLESS CAKE.—*Boiled Cake.*—Put in saucepan 1 cup sugar, 1 cup water, 1 cup currants, 1 cup sultanas, nutmeg and spice, a few almonds, and a little peel, 2 teaspoonsful treacle, ¼lb. dripping, and simmer for 15 minutes. When cool stir in 2 cups S.R. flour, ½ cup plain flour, ½ teaspoonful carbonate soda. Bake slowly for 1½ hours. This recipe was considered very economical at the present time, when eggs are fairly scarce.

The following recipe for biscuits is also made without eggs:—*Short Bread Creams.*—¼lb. butter, 2ozs. icing sugar, 2 small cups S.R. flour. Cream sugar and butter, add flour, mix to a soft paste, break off piece the size of a marble, press slightly flat with a fork so as to form little squares on the top. Stick together with butter icing.

Tomato Sauce.—12lbs. tomatoes, 1lb. apples, 1lb. onions, 1½lbs. sugar, ¼lb. salt, 1oz. allspice, ¼oz. each cloves, mace, and cayenne pepper, 1 quart vinegar, boil three hours. If too thick add more vinegar. Add a little ginger if liked.

The following recipe for shaving cream has been made and found very good:—*Shaving Cream.*—1 small packet Lux, 6 cups boiling water. 2 tablespoonsful olive oil, little perfume. Beat together until well dissolved. Keep airtight.

Custard Creams.—A biscuit recipe with custard flavouring; ¼lb. butter, 4 tablespoons sugar, 4 tablespoons custard powder, 1 cup flour, 1 egg, 2 tablespoons baking powder, and a little milk. Bake in moderate oven for 10 minutes. (Secretary, Miss E. Roocke.)

WILLIAMSTOWN WOMEN'S (Average annual rainfall, 27.77in.).

June 5th.—Attendance, 6.

ODDS AND ENDS.—Paper read by Mrs. Hamilton:—When your lamps smoke badly and you think it necessary to buy new burners, try burning the burners for half an hour in water to which has been added a quantity of soda, removing from the water while hot, so that they may be easily dried. This thoroughly cleans them, and your light will be as bright as when burners are new. When vegetables are wilted, add the juice of a lemon to a pan of cold water, and let them stand in it for an hour; they will be almost as fresh as when gathered. This is especially good for lettuce, spinach, celery, and parsley. Sew a safety pin on the outside of your ''rag bag'' and as you add a piece of material to the bag, clip off a bit and put it on the safety pin. A glance will tell you just what the bag contains and you will be saved the trouble of hunting through the entire contents.

EGGLESS RECIPES.—*Eggless Biscuits.*—Three cups plain flour, 1 cup butter (or ¾ cup of good clean dripping), 1 cup sugar, ½ cup milk, level teaspoon carb. soda, a little essence. Put milk and sugar on to boil and when boiling add the soda and stir well, then set aside to cool. Rub butter (or dripping) into flour and add pinch of salt. Beat sugar, milk, and soda mixture and add to the flour. Add essence. Knead and roll out and cut into shapes and bake for about 10 minutes in a quick oven. Eat either plain, or one-half iced or spread with jam or lemon butter, and the other half placed on top and iced. *Black-fellows' Cake.*—Boil together ½ cup of raisins, ½ cup currants, ½ cup sultanas, ½ pkt. mixed spice, 1½ cups water, 1½ tablespoons butter, 1 large teaspoon carb. soda, and 1 cup sugar. After coming to boil, take off fire and cool. Add 2 cups S.R. flour (the mixture should drop easily from spoon); bake in moderate oven for about ¾ to 1 hour. This cake is excellent if cooked in large log tins and better if kept a couple of days before cutting, although it can be cut straight away if desired. *Eggless Pudding.*—Six ounces flour, 1 tablespoon sugar, 1 teaspoon carb. soda, heaped teaspoon jam, 2ozs. butter. Rub butter into flour and add sugar and jam, mixing well. Mix soda into half teacup warm milk; add to mixture. Immediately pour into greased basin and put greased paper over the top. Steam 1½ hours. Serve with a sauce. (Secretary, Mrs. G. E. Cundy.)

AGRICULTURAL BUREAU CONFERENCE.

The several Women's Branches located in the western districts of Eyre's Peninsula held a Conference at Ceduna on the 3rd of July, when over 60 members attended. The arrangements were made by the Laura Bay Branch, and Mrs. W. W. Bowell presided.

In conjunction with the Conference the Laura Bay Branch conducted an exhibition of cooking and needlework, which was capably organised by the Secretary, Mrs. R. W. Burke. The entries made an attractive display, and were closely inspected by visitors during the day. The judges were Mesdames L. E. Trebilcock, I. Allport, and C. Lutz.

The General Secretary (Mr. H. C. Pritchard) addressed the Conference on the work of the Women's Branches, outlining the manner in which their meetings should be conducted and indicating proposed work for the future.

Miss V. Barnett read a paper on needlework and Miss L. Blumson on laundry work.

Mr. H. B. Barlow (Chief Dairy Instructor) spoke on dairying on the farm, inspected the displays of butter at the exhibition and pointed out faults in manufacture.

BISCUIT RECIPES.

[Supplied by members of the Kybybolite Branch.]

Bubble Macaroons.—4oz. butter, ¾ cup sugar, 1 egg (well beaten), 1 large cup S.R. flour, 2 cups rice bubbles. Drop in spoonsful on greased slide. Bake in slow oven.

Peanut Drops.—¼lb. butter, ½ cup sugar, 1 egg, pinch salt, 1 cup S.R. flour, ½ cup chopped peanuts. Drop in spoonsful on greased tray and bake in a moderate oven.

Cocoanut Biscuits.—¼lb. each flour, cornflour, sugar, butter, des. cocoanut, 2 eggs, 1 level teaspoon cream tartar, ½ soda, vanilla essence. Beat butter, sugar, and eggs together. Add flavouring, flour, cornflour, rising, and lastly cocoanut. Roll out and cut into shapes. They may also be put in spoonsful on oven slide.

Foam Biscuits.—½ cup milk, 1 cup each sugar and butter, 3 cups flour, ½ teaspoonful soda, vanilla essence. Rub butter into flour. Bring sugar, milk, and soda to the boil, and when it foams cool slightly, then add to flour and mix. Roll out very thin, cut into shapes, and bake in quick oven.

Scotch Shortbread.—4oz. castor sugar and 13oz. flour sifted together, 8oz. butter, ½ teaspoon salt. Stand basin containing butter over saucepan of boiling water until quite liquid. Pour butter slowly into sifted sugar and flour, working into a stiff dough. Turn on to floured board and press very well together until quite free from cracks. This may not be accomplished at once. Use the knuckles to knead. Roll into several small rounds about ½in. thick. Prick well with a fork. Slide on to an oven tray which is covered with a piece of greased paper. Bake for ¾ hour in a moderate oven, decreasing the heat gradually after it has set firmly. It should be very pale in colour, not brown.

Ginger Biscuits.—2 cups flour, 1 cup sugar, pinch of salt, 2 eggs, 4 tablespoons butter, 2 tablespoons golden syrup, 2 dessertspoons ground ginger, 2 small teaspoons baking powder. Sift flour, ginger, and baking powder well, cream butter, sugar, and salt, add eggs singly, beating well, then syrup, lastly flour, &c. Rub on well greased oven slide in very small teaspoons; cook in moderate oven for about 10 minutes.

Honey Pusher Biscuits.—Sieve ½lb. flour with pinch of salt, 1 teaspoon cream of tartar, and ½ teaspoon of soda. Beat 4oz. of sugar with 4oz. of butter or good dripping to a cream; add 1 egg and beat again; add 1 dessertspoon honey and beat well together. Gradually add the flour and powders and squeeze of lemon and mix well. Put through pusher and bake in a moderate oven.

Cream Biscuits.—1 cup each cream and sugar, 2 eggs. Beat together until sugar is dissolved, then sift in 3 cups self-raising flour. Divide mixture if different varieties are needed. *For Plain Biscuit*—Flour with any flavouring and roll out thin. Bake until golden brown. *For Orange*—Sandwich flavour orange rind and juice and when cooked fill with orange filling. *For Chocolate Creams*—Flavour with chocolate or cocoa and fill with vanilla cream. *For Lemon Bars*—Flavour with lemon rind and juice. *For Sugar Buttons*—Small pieces of mixture rolled into a ball and dipped in sugar.

Raisin Biscuit.—2 cups S.R. flour, 1 cup each sugar and cornflour, salt, 2 eggs, 1 cup butter, about 4 teaspoons milk. Sift flour, salt, and cornflour, rub in butter. Mix beaten eggs and milk together and add to flour, using just sufficient to make a stiff biscuit dough. Roll out thin and cut into rounds. Bake in a moderate oven 15 minutes. When cold spread with filling. Put two together and ice top. *Filling*—Mix together ½lb. seeded raisins, 2oz. chopped nuts, and make into paste with lemon and orange juice.

Orange Cream Fingers.—Cream 2 tablespoons butter with ½ cup of castor sugar, add 2 eggs, beat well and then sift in ½lb. plain flour to which has been added 1 teaspoon cream of tartar, ½ teaspoon carbonate of soda, and pinch of salt. Mix to dough and roll out and cut in thin fingers. Bake in quick oven 10 minutes. *Filling*—Three tablespoons icing sugar, 1 tablespoon (large) butter. Add piece of ½ an orange and warm over fire.

Slugs or Cocoanut Biscuits.—¼lb. butter, 3oz. sugar, ½lb. flour, 1 tablespoon cocoanut, 1 egg, 1 teaspoon cream of tartar, ½ teaspoon carb. soda. Cream butter and sugar, add eggs and cocoanut, and lastly flour and rising. Roll 12in. long in cocoanut, &c. Bake about 10 minutes in a moderate oven.

Date Dainties.—1½ cups of flour, 1 teaspoon cream tartar, ½ teaspoon carb. soda, pinch salt, ¼lb. butter, ½ cup sugar, ¼lb. dates, and 12 walnuts, 2 eggs. Sift flour and powders, add sugar, then rub in butter. Beat eggs and add to mixture, then dates and nuts and mix well. Place in spoonful on buttered slide and bake 10 minutes.

Cocoanut Biscuits.—½lb. S.R. flour, pinch salt, 3oz. butter, 6 good tablespoons cocoanut, 1 egg (1 or more tablespoons milk if needed), 3 tablespoons sugar. Sift flour, put in sugar and salt, rub in butter, add cocoanut. Mix to dry paste with egg, roll into small balls and flatten. Bake from 15 to 20 minutes. (Secretary, Mrs. M. Kekwick.)

SWEETS.

[Recipes supplied by Miss Patterson, Warramboo Branch.]

Cocoanut Candy.—2 cups sugar, ½ cup water, 2 teaspoons cream of tartar, 2 drops vanilla, ¾ cup cocoanut. Boil for 5 to 10 minutes, put in cocoanut and then stir until white.

Cocoanut Lollies.—2 cups sugar, ½ cup milk, ¾ cup cocoanut. Boil 5 minutes, pour out and stir until creams. When cold cut in squares.

Uncooked Sweets for Emergencies.—Fondant from icing sugar used in various ways (ginger, dates, and almonds)—*Date Balls*—Dates soaked and mashed with cocoanut. Uncooked sweets do not keep, must be fresh. Cocoanut macaroons a good substitute. Beat whites of 2 eggs with 5oz. sugar until stiff enough to hold shape, stir in 2oz. cocoanut and bake in tiny cakes until dry. Gelatine is very useful and convenient for sweetmaking, particularly Turkish delight and snowballs.

Turkish Delight.—Take 3oz. gelatine soaked in 1 cup of water for 20 minutes, put into saucepan with 1½ cups water and 2lbs. sugar. Boil 15 minutes, stirring all the time. Flavour with lemon and citric acid, colour some with cochineal. Pour into plates to cool.

Snowballs.—1oz. gelatine, 2½ gills of water, 1lb. sugar. Soak the gelatine in 1½ gills of water for at least 20 minutes. Boil the sugar and the rest of the water (1 gill) for 10 minutes, then add the soaked gelatine and water and boil for 10 minutes more. Turn all into a large basin and beat until cool and stiff. Form into balls with fingers while still slightly warm. Cover with chocolate and cocoanut.

Butter Scotch.—4 tablespoons butter, 2 tablespoons golden syrup, 2 tablespoons milk, 1 tablespoon vinegar, 1 tablespoon cold water, 12 ozs. sugar. Boil together for 5 minutes or until brittle when dropped into cold wate.. Put almonds on buttered plate and pour over the mixture. Let set until cold.

Snowballs.—Soak 1oz. gelatine in 1½gills (12 tablespoons) of water for 25 minutes. Boil together 1lb. of sugar and 1 gill of water for 10 minutes until dissolved, add soaked gelatine to water, and boil 10 minutes longer. Turn the mixture into a big basin and beat until it is cool and stiff. Form into balls with the fingers while it is still slightly warm. Dip them into a chocolate coating and finally roll them on a dish sprinkled with desiccated cocoanut. To make chocolate coating, take 2oz. unsweetened chocolate, a few drops vanilla, and a little hot water—a very little at a time as you need it. This should be melted and snowballs dipped in it.

Cocoanut Ice.—2 cups fine white sugar, ½ cup milk, ¾ cup desiccated cocoanut, a few drops vanilla and red colouring. Heat sugar and milk together and boil for 5 minutes, stirring all the time. Then add the cocoanut and boil for another full minute. When flavouring and colouring is liked, add it with the cocoanut. Remove from the fire, and as it cools beat well (a wooden spoon is good) until it goes creamy. Pour quickly into a wet dish or on to waxed paper to set. Cut into pieces. (Secretary, Miss J. P. Patterson.)

TOMATOES AND THEIR USES.

[Mrs. W. Woods, Wirrilla.]

The tomato is grown extensively in summer, and is appreciated by everyone during hot days. When the housewife is at her wit's end to know what to prepare, if there are tomatoes in the house, one can rely on having a cool meal when the men come in from the paddock. If a hot meal is preferred, a tomato pie can be served with roast beef or mutton, made as follows:—Butter a dish and fill up with alternate layers of sliced tomato, sliced onions and bread crumbs, with a little butter or dripping on top of last layer of crumbs and bake to a nice brown.

Another Recipe.—Dip three or four tomatoes into boiling water for a minute or so. Dry and remove the skins, cut in slices, season with pepper and salt. Mix 3 tablespoons breadcrumbs and 2 tablespoons grated cheese together. Place tomatoes and bread-crumbs and cheese alternately in a greased pie-dish, having crumbs for the last layer. Put 1oz. butter in small pieces on top of dish and bake 20 minutes.

Before serving the hot roast and vegetables, serve tomato soup, which is made as as follows:—2lbs. tomatoes stewed for 15 minutes in 1 gill of water, strain through flour sieve. The more pulp forced through the better and richer will be the soup. Return pulp to saucepan. Add an equal quantity of milk, butter size of walnut, pepper and salt to taste, and when heated a thickening of flour or cornflour, and 1 teaspoon sugar. Boil gently for 5 minutes,

Bottled Tomatoes are useful for making tomato soup during winter, when soup is more appreciated than during hot weather. They are simply done: Scald the tomatoes with boiling water, press them tightly into the bottles, put on the lids and clips and put in sterilizer. Fried tomatoes are also very tasty, cut them in slices, sprinkle with pepper and salt, and fry until cooked.

Tomato Toast.—Chop up a little bacon and put into a small saucepan to cook with a small piece of butter for a few minutes, then add two or three tomatoes which have been skinned and cut up, and a little pepper. When tomatoes are well cooked, break in 2 eggs and stir well. When thick enough, put on the pieces of buttered toast. Another similar recipe is to put on three or four good sized tomatoes with pepper and salt and when cooked add 3 beaten eggs, stir well, and when done serve on toast.

Tomato Cheese.—Two fair sized tomatoes, 2 or 3 small pieces of cheese (that have got too dry for table use), 2 tablespoons of milk, a little pepper and salt. Cook in small saucepan 2 or 3 minutes and serve on toast.

Tomato Nest Eggs.—4 large firm tomatoes, 4 eggs, a little grated cheese, salt, butter, pinch cayenne if wanted. Wipe the tomatoes and cut a large slice off the top, scoop out the pulp, season inside with cheese, salt and cayenne. Place tomatoes on a greased slide and carefully break an egg into each one, Place a little butter and cheese on top and replace lid. Bake in a quick oven until egg set. Serve on rounds of buttered toast.

Stuffed Tomatoes.—½oz. bread crumbs, 1oz. butter, 2 level tablespoons chopped parsley, 2 teaspoons grated cheese, 1 level tablespoon chopped onion, salt, pepper, browned crumbs, 1 level tablespoon thick gravy or sauce. Mix all except cheese and browned crumbs. Scoop out some of soft part of tomatoes and fill with mixture, putting a little cheese and browned crumbs on top, bake till done.

Cold meat chopped finely and flavoured with nutmeg can also be used and served on fried bread or toast. Tomatoes can also be stewed with a little butter, and seasoned. Cook for 20 or 30 minutes, add a tablespoon of vinegar and serve with roast meat,

Tomato Sauce should not be made with tomatoes that have been picked after a rain, and if the sauce is made later in the season, the tomatoes are inclined to be watery, thus making the sauce very thin. Tomatoes should be firm and not over ripe to get the best results for sauce making. Following is a good recipe:—12lbs. tomatoes, 3 cups vinegar, 6ozs. salt, 2ozs. garlic, ½oz. each cloves and mace, 2 cups sugar, 2 large apples, ¼oz. cayenne, 1 large onion. Boil all together for three hours, then strain through a sieve. Before putting on the tomatoes, scald and skin them. (Secretary, Mrs. W. Jones.)

KINDERGARTEN WORK.

[*Paper contributed by Mrs. Sandercock (Belalie) and read at the April meeting of the Wirrabara Branch.*]

The word "kindergarten" is made of two German words meaning the child's garden. The training of the child's mind can be likened to the growing of seeds in the garden. Its thoughts and fears have to be gently cared for to produce the right foundation for adolescence. Like to the soil in the garden, the atmosphere, which is the environment of the child, is where the seeds of its thoughts grow. It is this atmosphere that a kindergarten teacher must create for her little learners.

The teaching of the young children has undergone a great change. The teaching of the children in the younger grades was not made so interesting as it is now with the latest methods. In these methods the teacher indirectly controls her class although she is not in the foreground. It was discovered that the children learned more quickly through their senses and they liked to create in their own small way. The first material the children were given to use was something with which they were all familiar, that is, their clothes. Frames were made on which materials were tacked and tape sewn to them. From these tapes the children learnt to tie and from that to using buttons, hooks, and fastening press studs. Then came the sense of touch. For this exercise the child is blind-folded with a bandage provided by the teacher and is given a board on which rough and smooth paper is pasted. He feels the paper, saying rough or smooth, as it is touched. From this simple exercise the more difficult ones are given, such as several pieces of rough and smooth on the board which have to be touched. The final sense of touch is given by allowing the child to feel sand-paper letters—a, m, p, etc.—thus setting the foundation for the teaching of reading and writing. The child of to-day has a more highly developed sense of touch in the tips of its fingers than we of the older generation.

The Sight.—The child is given a set of colours, having two of each colour in it. He must pick out the colours and place them in their correct pair. A little more difficult exercise is for him to arrange several colours such as blue, green, yellow, &c. These range from the lightest of blue to the deepest. H is required to place each colour in correct position, having the lighter shades merging into the dark shades. Then blocks are given by which the child finds the largest and builds upon it till the smallest is reached. Pictures are also used in the development of the sight. Allowing the chi n to tell what is seen in a picture is the fore-runner to composition. From this t the children learn when in Grade I. to look at a word and hear it pronounced recognise it when seen again.

Many interesting lessons can be given to develop the sense of hearing. So are taught collectively. One fascinating game which the children like to ringing of the bell from different places in the room. One child rings an whose face is hidden, points to the direction whence he thinks the sound set of material used by the individual child is the pairing of tins containi quantities in them to give out the same sound when shaken, such as equa of sand, wheat, stones, peas, &c. These have to be shaken and placed in use of the piano is one of the finest exercises for the development of the Children are taught to combine rhythmical steps with tunes on the piano. Simp steps such as march, run, skip, &c., also a chord for stopping work; a bar of music to return to their seats. An efficient kindergarten teacher can give most of her orders from the music which she plays on the piano. When learning the sounds such as a, e, t, &c., a teacher shows them the letter and tells them what it is they hear and are able to recognise the letter and sounding of it when next shown to them.

The sense of taste does not directly help the child in his school life as the three before-mentioned. Although in the kindergarten class lessons are given to test the

child's power of taste. Such a game is to have a cup each containing milk, w cocoa, raspberry, &c., for the child to taste which he must name after sipping the, li

The sense of smell is similarly dealt with by letting the child smell such thin soap, butter, ink, chalk, &c. These make very interesting games for the children love to play them. In the kindergarten class half of the period is set lessons bu other part is free period. All the exercises described and many others are plac cupboards and the child is allowed to choose his work. After he has finished h still until the teacher sees that the work is correct. He may then pack it awa start on another. The first step learnt in the teaching of writing is by an inset. are made out of wood and cut in different shapes such as a circle, oblong, square, diamond, &c., a small knob is placed in the centre for the child to handle it places this inset on his board, draws the shape with chalk and fills it in with s strokes. When he can master this with chalk he is given a blank book and co pencil in which to work an inset. After this comes the feeling of the sand letters a, c, i, then the writing of these letters in chalk on the blackboard, and the use of the pencil. The object of all kindergarten teaching is to allow the freedom of expression.

Mrs. Cugley read a paper, "His Majesty the Baby." (Secretary, Mrs. A. M. Cu

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Auburn	31/5/35	23	Display of Cushions and Cosies	Miss L. J. Dennison
Clare	1/6/35	31	Travel Talk—Mrs. J. Christison	Mrs. A. Pollock
Narridy	1/6/35	29	"Preserving Fruits, &c." —Mrs. R. Darley	Miss B. J. Reynolds
McLaren Flat...	6/6/35	24	"American Afternoon"..	Mrs. B. Powell
Kybybolite	14/5/35	25	Address—Mayor of Naracoorte	Mrs. W. D. Kekwick
Taplan	6/6/35	11	"Sweet-Making" -Mrs. Moffatt	Mrs. W. Flynn
Sheoak Log	6/6/35	—	"Interior Decoration"— Mr. Gooden	Miss K. L. Koch
Wasleys	13/6/35	58	Needlework Competition	Miss J. Braun
Hope Forest ...	5/6/35	23	"Australian Birds"—Mrs. H. Dodd	Mrs. L. Fincher
Mangalo	12/6/35	7	Poultry Dressing Demonstration—Mrs. Cleave	Mrs. F. Coles
Warramboo	14/6/35	12	Annual Meeting	Miss J. P. Patterson
Taplan	27/3/35	14	"Tomatoes—Growing and Use"—Mrs. Fogden	Mrs. W. Flynn
[illegible]	2/4/35	6	"Why we Cook our Foods"—Miss J. Gregurke	Miss E. Roocke
[illegible]	13/6/35	—	Cake and Cushion Competitions. Annual Social and Dance	Miss T. M. Franks
[illegible] ..	17/6/35	18	Papers by Belalie Members	Miss M. W. Stot
[illegible] .	14/6/35	14	Discussion	Mrs. C. H. Kulb
[illegible] .	10/6/35	100	Annual Social	Mrs. A. Hockin
[illegible] ..	17/6/35	15	Papers, &c., by Belalie Members	Miss L. G. Mart
[illegible] ..	17/5/35	21	Address—A. L. Warren .	Mrs. H. J. Hutc
[illegible]n ...	6/6/35	13	Annual Meeting	Mrs. Z. A. Bign
[illegible]ola	5/6/35	33	Woolwork Display	Mrs. F. J. Kidm
Parrakie	26/6/35	19	Social	Miss J. Halliday
Morchard	26/6/35	14	Annual Meeting	Miss F. Brown
Saddleworth ...	4/6/35	8	Papers from Conference .	Miss G. E. Frost
Saddleworth ...	2/7/35	19	"A Trip to Sydney"— Miss G. E. Frost	Miss G. E. Frost
Gladstone	18/6/35	58	Annual Meeting	Mrs. L. J. Sargent